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IF the number and size of the reservations of space made by supply manufacturers for the annual railway appliance exhibition to be held in Chicago in connection with the convention of the American Railway Engineering Association in March may be regarded as any criterion of their views of the business outlook, they are anticipating that 1912 will be a far more prosperous year than was 1911. The list of those who will have exhibits, published elsewhere, shows that not only is the extent of the entire exhibition to be increased, but that many who have been prominently represented in previous years have taken still larger spaces this year. Although 16,000 sq. ft. of extra exhibit space have been made available by renting the First Regiment Armory in addition to the Coliseum, nearly all of it has, at this early date, been reserved. The steady growth of the exhibition since the organization of the Railway Appliances Association, and the beginning of the use of the Coliseum instead of the parlors of the hotel where the engineering conventions were held, is but one illustration of its increase in importance. Another illustration of this is afforded by the fact that concerns dealing in appliances used in the mechanical, as well as in the maintenance of way and construction department, are enrolling themselves among the exhibitors. The exhibition is now attended not only by engineers incidentally to their attendance on the convention, but by them and by numerous other railway men from all over the country because of its independent educational worth.

THERE is an old story of a president of a 10-mile railway, who, on being refused exchange transportation over the Pennsylvania because of the difference between the mileage of the two roads, replied: "My road may not be as long as yours but it is just as wide." A great deal of free transportation is being issued every year by the railways of the United States for the issuance of which many persons can see no more convincing reason than the one given by this president. In another column is published a letter from a yardmaster regarding what he calls "the abuse of the pass privilege." "Yardmaster" suggests that free transportation be abolished and that a nominal, or at least a reduced, rate be charged railway employees when traveling for their own pleasure or on their own business. Some railway officers have gone so far as to suggest the entire elimination of exchange transportation for even railway business travel. A few years ago such a proposal would have seemed radical, but now that federal and state laws have greatly reduced the pass giving and receiving custom the idea of still further restricting it may be viewed in a different light. The practice on the part of railway officers of giving passes to friends, politicians and shippers was—and, where it still obtains, is yet—open to abuses not inherent in the custom of the A. B. C. railway standing a part of the expenses of an officer or employee of the X. Y. Z. railway, traveling on company business, or even taking his wife and family on a vacation trip. But it is a question worth considering whether the railways would not put themselves in a sounder position before the public, as well as establish more business-like relations among themselves, if they stopped the practice of exchanging annual or term passes, confining the use of such transportation to their own officers and employees when on their own lines and issuing trip passes to those of other lines, and then only under special circumstances. Interchangeable mileage tickets could be used for employees required to travel constantly over different roads. The existing practice in most instances has been reduced to a matter of routine which precludes the idea of the extension of a courtesy, and, while between many roads the exchange of transportation probably is approximately equal, there are many cases where this is far from true; and in all cases the practically unrestricted issuance and exchange of transportation doubtless involves much needless expense. A frank expression of views on this subject by railway men might lead to good results.

THERE are some special reasons that make the state of Massachusetts an interesting field for railway study. It has a dense population very largely grouped in cities. Its railway capitalization has been conservative and its railway corporations under close supervision by a railway commission. The nature of its population has given it an exceptionally large passenger business in ratio to freight; and in freight business it has been a great consumer of raw material while shipping away factory products much less in volume than incoming freight but of a much higher freight classification. It is superlatively a factory state. Such features call attention to the returns of the state railway commission for the last fiscal year, which report has just appeared. As compared with 1910 the general railway business shows a handsome increase, passengers carried rising from

160,769,201 to 162,940,242, freight tonnage from 55,786,434 to 56,557,644 and gross revenue from $120,140,993 to $123,959,490. But this increase in gross of $3,818,497 was much more than offset by an increase in expenses of $7,458,386, increased expense thus almost doubling increased gain in gross earnings, higher wages undoubtedly being the greater element. When the depression in Massachusetts textile industries is considered (26 mills in Fall River alone reduced dividends in 1911) the gain in gross earnings, however, seems remarkable. Not so cheering is a deficit of $4,444,762 over dividends as compared with a surplus of $1,165,737 in 1910, even though we allow for the heavy net losses of the Boston & Maine system. That such a net showing should be made in an old and populous commonwealth where railway conditions are supposed to be stable is a little startling. It is qualified by the fact that the conditions are probably temporary and that Boston & Maine rehabilitation and efficiencies will ere long modify the returns. Passenger revenue rose from $52,995,871 in 1910 to $55,602,106, while freight business increased only from $64,070,157 to $65,038,750, illustrating the general condition of the higher sustaining power of passenger traffic compared with freight—though a rise of average passenger fare from 1.65 to 1.72 cents a mile, while the freight rate per ton mile fell from 1.18 to 1.17 cents, partly accounts for the difference. Evidently the Massachusetts companies were able to lift decidedly local passenger rates in avoidance of any interstate rulings. In connection with the subject of supervision of railways in the state may be noted the urgency of Governor Foss in his message that the railway commission be merged in a "general utilities" body having supervision of electric and gas lighting, telegraphs and telephones also. It is a phase of commission development all over the country to which we have alluded heretofore. But in the case of the Masachusetts railway commission, already overloaded with duties connected with both the steam and street railways, the plan has exceptional infirmities.

THE CIVIC PERIL OF THE RAILWAYS.

THE most conspicuous fact on a broad scale in the life story of our American railways has been their segregation into a comparatively few large groups—in other words, their drift to consolidation. It has come through the action of several forces: Branch lines have passed to main lines by natural absorbtion, resting either on normal value as feeders or on fear of rival control. Rival lines have coalesced under the law of abated competition. Connecting lines have been joined on the principle of more efficient management or to secure important and remoter terminals; and, finally, considerable systems already consolidated have combined with others on what is really the basic motive of consolidation, namely, control of railway territory. With the railway groups grown so big, and with the interstate relation constantly deepening, contacts with federal authority were probably inevitable; and the step was but a short one to new contacts with state authority, too. Probably the most philosophical and certainly the most charitable view of the long series of antagonisms between the civic authorities and the railways is that which thus attributes them to fundamental conditions. That the antagonism has been stimulated by popular outcry and the play of political and partisan motive the same kindly philosophy will perhaps treat as an unfortunate but logical incident in which the railway corporations themselves have had their share of the blame. But the result of it all has been the creation of certain tendencies of a broad and general character which, in the look ahead, are worth their attention.

One of these tendencies bears as much on civic authority as on the railways—indeed, even more. Side by side has grown interstate as well as intrastate regulation of the railway. Federal regulation and state regulation, the inner and the outer regulation, have both been intensified. They are now, theoretically at least, held apart by a constitutional division. But in character as well as directions they are approaching each other and their limitations growing less definite. Just where, for example, as a practical question, is the line to be drawn when an intrastate railway corporation controls by a holding company or otherwise a railway in another state owning its separate charter? The attorney general of the United States brought suit against the New Haven for holding Boston & Maine shares. But he withdrew it when the state of Massachusetts ratified the holding, although there was not the slightest change in the economic and physical situation—indeed, the "restraint of trade," if it existed at all, was increased by the state's enactment. On the other hand, if he had not withdrawn the suit he might have been in collision with the state. This case—and other instances are the Minnesota rate case and the Supreme Court safety appliance decisions—illustrates the way in which federal regulation is moving toward state regulation, and *vice versa*, a tendency on which the Hadley commission laid considerable stress. If the result be a general collision, as it already has been in some instances, the difficulties of either judicial or constitutional adjustment are obvious. Meanwhile, the misfortune of the railway in sustaining the impact of both movements is also obvious. It is between the state and federal millstones that often grind exceeding small in more senses than one.

A second tendency, of an external and compulsory nature, is outlined in what may be termed the federal policy of paternalism. That paternalism in the railway case has apparently been extended to the shipper rather than the railway carrier, in whose case federal paternalism has at its best been that of the scriptural parent who spares not the rod. Such paternalism has its present evil of undue severity. But it has other evils that inhere in the thing itself. Unjust paternalism cannot last forever. The railways approximate one-third of the corporate wealth of the country, and form about one-sixth of its total wealth. They are interweaved closely with almost every element of national prosperity. Their material magnitudes and the direct and indirect interests that they involve must inevitably force a reaction toward justice in the federal policy. But it may still be a justice based upon a paternal regimen—a dependent relation upon a fickle parent that now yields up no powers, but rather seeks larger powers. Nor can the federal parent be exactly described as possessed of acute perceptions in the solution of the problems of railway management. The evident danger of such paternalism is its narrowing of the gap between regulation and ownership—a federal tendency toward taking the final step and a railway tendency to accept it as a choice of evils. How grave that alternative evil would be in a civic as well as an economic sense hardly needs demonstration. But it is an evil toward which excessive regulation, whose other name is paternalism, points the way.

Through both these tendencies which we have described, whether they pertain to state or federal powers, there has run a bad principle. Stated briefly, it has been—and is—the confounding of an economic question with a civic one. Railway regulation has been approached overmuch from its civic side, using those terms here broadly, so as to include such elements as public feeling, politics, and immediate or ultimate vote-getting. The economic, the commercial, the investment side of railway regulation, while not ignored, has been thrust to a secondary place. The railway corporation, for example, has been treated as though it were a body made up merely of a group of directors with a president and secretary, instead of a great body of stockholders with interests at bottom exactly analogous to those of the shopkeeper or the private factory owner. The railway differs from them in form, is *quasi* public, owns charter privilege and obtains certain powers of eminent domain, and, on those grounds, opens itself to regulation. But the fundamental interests are private and personal, possessed of vested and material rights of an elementary quality and rooted in the old common law. The question of the future is how far that principle is to be recognized and one-sided paternalism of federal and state authority contract its powers and be modified into the economic equities. On that idea—with the aid of the courts as interpreters of organic law—rests the hope that certain dangerous tendencies now affecting the railways may be checked.

GIVE THE COMMISSION POWER TO STOP UNFAIR DISCRIMINATIONS.

STATEMENTS by the Interstate Commerce Commission in that part of its annual report in which it discusses the action of the Commerce Court in restraining it from enforcing its order in the Transcontinental Rate cases make clear that it does not believe it has authority in any circumstances to fix an absolute or a minimum rate. It says (page 38):

"The Commerce Court intimates that the mistake of the commission is in having attempted to fix a relation of rates instead of establishing reasonable rates; but, as we have already pointed out, there is no way in which the discrimination found to exist in these tariffs can be prevented except by fixing a differential, since we have no power to establish an absolute rate or fix a minimum charge below which the carrier is not free to go."

It does not follow from the commission's reasoning that the law authorizes it to adjust rates as it sought to do in these cases. But it does seem probable that its view, that in no case can it fix an absolute or a minimum rate, is a correct interpretation of its power. Except in the fourth section, the only authority the act to regulate commerce gives it over rates which it has found unreasonable is that of fixing the "reasonable maximum" rates thereafter to be charged. Therefore, the commission cannot prevent any discrimination that the railways may be disposed to persist in effecting unless possibly it be one to which the fourth section applies; for if the commission shall find that one of two rates is relatively too high and order it reduced, the railway may reduce the other rate in proportion, and thereby perpetuate the discrimination.

The fourth section, however, provides, in substance, that the carriers must get the permission of the commission to charge a lower rate for a longer than for a shorter haul, and that the commission may prescribe the extent to which the one rate may be made lower than the other. It has, therefore, been argued by some that where the long and short haul question is involved the commission may fix a specific minimum rate for the longer haul. As the quotation made from its annual report shows, the commission rejects this view. If the question were presented directly to the courts it seems probable they would hold that any authority which is not clearly conferred is not given at all; and certainly the power to fix absolute or minimum rates is nowhere expressly conferred. Therefore, the conclusion seems justifiable that the commission has not authority, even under the fourth section, to fix minimum or absolute rates, and, consequently, has not adequate power to prevent unfair discrimination in rates in any case whatever.

At another place in its annual report (page 34) the commission says:

"The commission might determine a rate below which the traffic would be unremunerative to the carrier and might refuse relief in case the carrier fell below this rate, but such an order would not reach the difficulty, since the point of discrimination might be passed long before the unremunerative rate was reached."

This is said merely in reference to the fixing of rates to the Pacific coast, but it applies with equal force to the entire matter of regulation of discriminatory rates under the law as it now stands. The rates on packing house products from Kansas City and Omaha to Chicago should, on every sound principle of rate-making, be the same. The railways might make a lower charge from Kansas City than from Omaha, which, however, might not be unremunerative. This would be an unfair discrimination against Omaha; but, under existing law, the commission could not remedy it, because, as it cannot fix a minimum rate, the roads could reduce the rate from Kansas City as fast as the commission could reduce that from Omaha. Similarly, the carriers can make a rate of, say, 2.85 mills per ton per mile on copper from Omaha to New York and charge rates which are very much higher in proportion on other commodities. This would be an unjust discimination against the shippers of all other commodities. But is the discrimination to be remedied by reducing all the other rates in the railways' tariffs? Obviously, the only fair way to correct it would be to raise the rate on copper and fix a minimum below which it must not go. The foregoing illustrations are not hypothetical. They describe almost exactly the present conditions. The rate on packing house products from Kansas City to Chicago is unfairly discriminatory as compared with that from Omaha. The present rate on copper from Omaha to New York of 2.85 mills per ton per mile is unfairly discriminatory as compared with the rates on practically all other commodities. Yet the commission cannot fairly correct these discriminations because they grow out of rates that are unfairly low, and for it to make all other rates in proportion would simply be to make all rates unfairly low.

The *Railway Age Gazette* long has contended that the commission should be given power to raise rates and prevent their reduction similar to that which it now has to reduce them and prevent advances, on the ground that only when it possesses this authority will it be able to correct and prevent all unfair discriminations. The commission's statements in its annual report support this position. Legislation of the nature indicated is especially needed to protect the small shippers and small communities that are put at a disadvantage by the incessant and often successful efforts of the larger shippers and the larger communities to get undue concessions from the carriers.

STEAM RAILWAYS AND STREET RAILWAYS.

THE street railways of the country in 1910 reached a magnitude of interests which, measured by outstanding securities, was $4,682,217,000. The figures are considerably higher now and may by the same test be reckoned, even allowing for profuse stock watering in the earlier stages, at about one quarter of the steam railway capitalization of the country in stock and debt. The growth and size of the "tractions" are impressive facts in themselves. But they become more interesting as elements in that general field of transportation where they acquire relations more or less close with the steam railway. There have been some recent changes in those relations which make the subject worth an up-to-date study.

In their earlier times the tractions as investments, except of the most speculative kind, were open to a suspicion which affected both stock and bonds, and which they have not yet outlived; and the calamitous "high finance" of the New York City tractions has persistently shadowed them at the financial center of the country. The "bond and bonus" plan so pervasive in their early financing, and to a degree still existant, has prejudiced their credit elsewhere. But many of them, especially during the last year or two, have begun to live down the old notoriety and become standardized. More and more our eastern states have begun to open the best traction bonds to savings bank and trust investment, and increasingly, as the returns of the savings banks prove, has the "institutional" demand taken them up. The result has been a somewhat acute competition of bonds of this type with the better class of steam railway bonds. The average good traction security has not yet reached the investment level of the good steam railway security. But it has been approaching it, and its higher yield in times when increased income has so much shaped personal investment has intensified the rivalry. One may go farther and say that in the general field of conservative buying the good traction bond has been one of the major forces to reduce bond prices. And when one notes, along with the fall of consols and of the higher class of railway securities in England, the estimate of the London *Economist* that durin 1911 some $100,000,000 of English capital has sought investment in this country, the American traction bond rivalry may even be vested with a foreign influence.

But, on the other hand, turning to the field of physical relations, the steam railway has in recent years made good. At first the competition of the traction was severe. As a parallel it affected not only long distances but short distances, and cut down steam passenger traffic to the lowest terms. Such conditions still prevail in limited regions in the West and South. But generally, in the older and more populous communities, with the initial rivalries lived down, the traction has become a feeder —or, more strictly speaking, its character as a lateral and feeder has come to dominate its nature as a parallel. This is especially true of the East, where profitable new traction teritory was long ago mostly exhausted. A minor factor is the tendency of

the suburban traction to bring the suburb into closer connection with the urban steam railway station.

Rarely an interstate line, the traction has in a great majority of cases escaped the federal interference which has visited the steam road, and, as a state and localized corporation, has probably been less subject to regulation by state commissions also. But it has had its own hardships. With a large constituency of passengers who use it at least twice a day, it has encountered in very intense form the criticism which the commuter loads on the steam road. It—the traction—is the target of sharp complaints of the overcrowded car, defective equipment and irregularities of service. The demand for transfer privilege is loud and incessant. Then, in the matter of fares, there is that vexing limitation of the nickel and the obstacles to adjusting it to zone systems; and retrenchment, when called for by financial needs of the traction company, is almost sure to meet stronger opposition than on the steam road.

Compared with present conditions, and in the light of recent progress, the future of the steam-traction relation is also an attractive study. Will the analogy of the New Haven and the New York Central continue, and the tractions gradually be absorbed by steam systems, themselves operated much more extensively by electricity than at present? Or, will the tractions, in the main, be segregated, as now? The best guess, if we look far enough ahead, probably favors the former alternative; but, if state policy and legislation allow it, it will be preceded by an interval of consolidation of the tractions into large systems, repeating thus the history of steam lines.

THE RAIL SITUATION.

IN its issue of December 15 the *Railway Age Gazette* published an editorial entitled "What Are the Railways Going to do About Rails?" which has been the subject of much discussion. Persons connected with both the steel companies and railways have complained because, as they have said, the statements in it implied that they have been doing nothing in recent years to improve the quality of rails and that there has been no improvement. The *Railway Age Gazette* did not say or imply that no efforts have been made to improve rails or that no improvements have been made. What it said was that the efforts made and the improvements effected have not been as great as conditions demand. It has also been asserted that our utterances conveyed the impression that the danger of accidents due to rail breakages is very great. The largest number of people killed in any year of the ten ending with June 30, 1911, as a result of derailments from rail breakages was 24, this being in the year ending June 30, 1910. The number thus killed in 1911 was twelve, which is less than the average trespassers killed on the railways of the United States every day in the year. The total persons killed as a result of derailments caused by broken rails in the ten years 1902-1911, inclusive, was 106. The total number killed meantime while trespassing on railway property was over 51,000. It is said the regulating authorities may take steps to reduce the accidents due to broken rails. If the public authorities would for awhile use their energy to reduce fatal accidents due to trespassing, for which the public and faulty drafting and enforcement of the laws are to blame, instead of to reduce the relatively very small number for which the railway managements are to blame, the results gained would be greater and more beneficial.

However, it is a fact that the number of derailments caused by broken rails is greater, according to the statistics of the Interstate Commerce Commission, than that due to any other defect of railway roadway; and the deaths thus caused in the past six months probably have exceeded those in any previous year. Some of the criticisms of our comments on this subject have shown a surprising lack of information regarding it. The following table giving the numbers of derailments caused during the past ten years by the various defects of roadway is based upon the statistics of the Interstate Commerce Commission. Doubtless in the report there are included under this head some breakages caused by defective equipment and not due to inherent shortcomings of the rails; but to what extent this is the case nobody knows.

It will be seen that the number of accidents due to almost all the different kinds of defects of roadway were greater in 1907 than in any other year of the last ten. This, doubtless, was due to the heavy increase in traffic in that year and the difficulties under which the railways handled it. If comparison be made merely between the figures for 1911 and 1907 the conclusion will be reached that there has been an improvement all along the line. However, even proceeding this way, the showing regarding rail breakages will not be found relatively encouraging. The number of derailments due to broken rails was greater in 1911 than in any other year for the last ten except 1907. On the other hand, the number due to spread rails was less in 1911 than in 1910, 1908 or 1907, the number due to soft track less than in any year since 1905, and the number due to irregular track less than in any year since 1907 except 1909.

Often no enlightening conclusion can be reached by comparing the results of one year with those of another. It is better to compare period with period. Let us, therefore, compare the five-year period 1902-1906, inclusive, and the five-year period 1907-1911, inclusive. The number of derailments due to broken rails increased from 825 in the first-named period to 1,234 in the second period, or 49½ per cent. Meantime, the number of derailments due to the spreading of rails increased only 39.4 per cent.; to soft track, 26.7 per cent.; to irregular track, 38 per cent.; to miscellaneous causes, 29.7 per cent.; and to all causes other than broken rails, 36 per cent. The percentages of increase in derailments due to bad tires and sun kinks were much greater, but the absolute numbers of derailments due to these causes are quite small compared with those due to other causes, and, therefore, do not materially affect the total results.

During the years mentioned there was a substantial increase in the railway mileage of the country. There was also a large increase in the traffic handled, the increase in passengers hauled one mile being 28 per cent., and in tons hauled one mile 30.4 per cent. There was not a proportionate increase in the number of trains run one mile to handle the traffic, but, on the other hand, there was an increase in the weight of cars and locomotives and in the average train load, and therefore, in the pounding and stresses to which the track was subjected. Therefore, other things being equal, some increase in rail breakages was naturally to be expected. It will be seen, however, that the increase of derailments due to rail breakages was substantially greater in proportion than in those due to other causes, and also was markedly greater in proportion than the increase in the traffic handled. If any conclusion at all can fairly be drawn from the foregoing figures it is that, from the stand-

DERAILMENTS DUE TO DEFECTS OF ROADWAY.

	Broken rails.	Spread rail.	Soft track.	Bad ties.	Sun kinks.	Irregular track.	Miscellaneous.	Totals.	Totals due to defects of roadway other than broken rails.
1902	78	60	50	8	9	85	257	547	469
1903	150	106	101	14	4	131	315	821	671
1904	176	115	95	25	13	151	291	866	690
1905	201	168	99	19	15	154	351	1,007	806
1906	220	168	180	25	13	232	449	1,287	1,067
1907	308	206	182	45	18	272	497	1,528	1,220
1908	238	200	151	42	28	211	545	1,415	1,177
1909	196	130	114	36	14	175	315	980	784
1910	243	171	110	31	28	202	336	1,121	878
1911	249	153	108	41	30	179	465	1,225	976
Totals	2,059	1.477	1,190	286	172	1,792	3,821	10,797	8,738
Five years ended June 30, 1906..	825	617	526	91	54	753	1,663	4,528	3,703
Five years ended June 30, 1911..	1,234	860	665	195	118	1,039	2,158	6,269	5,033
Increase p. c. latter period.....	49.5	39.4	26.7	114.3	118.5	38.0	29.7	38.4	36.0

point of public safety, the improvement in rails has been substantially less than the improvement of the condition of the roadway in general. It may be said that the number of derailments due to broken rails is not a true index of the number of rails that break, because there are many more breakages than there are resulting derailments. But if we may fairly assume that the care the railways took properly to inspect and maintain their track was as great in the last as in the preceding five-year period, it must follow that they detected and took out of the track during the second period as many broken rails in proportion which did not cause accidents as they did in the earlier period, and that the number of breakages causing derailments is, therefore, a true index of the total number of breakages. As a matter of fact, probably more care was taken to look for and remove broken rails during the later and during the earlier period.

One criticism that the *Railway Age Gazette* passed on the railways in the editorial heretofore referred to was that they do not give publicity to data which show the facts about rail breakages and the reasons for them. We also suggested that they could get better rails by concentrating their orders on the mills that make good rails. We have compiled all the data regarding rail breakages during the year ending October 31, 1910, which the railways have furnished to the American Railway Engineering Association, and a summary is presented in the following tables:

RAIL BREAKAGES PER 10,000 TONS IN TRACK REPORTED.

Mill.	100 lb.	90 lb.	85 lb.	80 lb.	75 lb.	Average.	Tonnage.
			Bessemer.				
I	31.2	37.3	45.0	8.0	10.5	29.5	2,628,040
II	28.1	119.4	42.2	51.0	22.7	50.6	2,466,843
III	18.6	39.9	10.6	11.9	20.6	18.6	1,159,903
IV	20.9	63.6	20.8	13.1	11.1	22.9	652,539
V	52.8	44.1	40.2	20.8	73.9	42.4	1,110,692
VI	....	....	15.6	40.4	10.8	20.1	583,374
VII	17.4	17.4	12.0	12.3	34.0	15.3	192,472
			Open Hearth.				
I	5.0	11.3	8.2	....	1.7	9.7	347,665
II	7.8	....	2.2	....	....	4.5	39,660
IV	10.6	....	....	....	....	10.6	18,881
V	....	0.5	....	....	....	0.5	43,733
VI	....	8.5	....	....	1.0	7.5	151,078
VII	5.1	....	3.7	....	....	4.4	78,988
VIII	24.9	54.2	13.1	....	....	39.5	222,427
IX	....	11.7	13.8	19.1	14.3	16.3	614,969

The facts will be made clearer to many person if the figures regarding Bessemer rails be presented on the basis of the number of rails reported in track in the year ending October 31, 1910, for each breakage. The following table reduces to this basis the above statistics regarding Bessemer rails:

NUMBER OF RAILS IN TRACK FOR EACH BREAKAGE.

Mill.	100 lb.	90 lb.	85 lb.	80 lb.	75 lb.	Total number rails.	Total number breakages.	Total rails for one breakage.
I	653.5	606.8	532.0	3,484.5	2,834.3	6,597,523	7,759	850.3
II	724.5	189.5	567.7	549.1	1,310.3	6,074,725	12,492	486.3
III	1,093.5	567.0	2,248.9	2,346.1	1,448.6	2,740,971	2,161	1,268.4
IV	972.0	355.4	1,149.5	2,129.6	2,685.0	1,477,778	1,494	989.1
V	385.4	513.2	594.5	1,344.2	403.6	2,671,095	4,712	566.9
VI	....	....	1,537.9	692.7	2,776.2	1,464,190	1,174	1,247.2
VII	1,173.3	1,043.9	1,993.6	2,276.0	878.0	477,521	294	1,624.2
Totals						21,503,803	30,086	714.4

We have used numbers instead of the names of the mills in these tables, because, as was said in our former discussion of this subject, the railways have not furnished anything like complete information regarding the rail situation, and to publish the names of the mills while giving only incomplete information regarding their output in track might do injustice to some of them. The incomplete data given indicates that the railways have been by no means concentrating their orders on the mills that make good rails. It will be seen that on the average there was only one breakage reported for each 850.3 of the rails of Mill I in track, this mill being credited with the largest tonnage; while there was one breakage for each 486.3 of the rails of Mill II in track, this mill being credited with the second largest tonnage reported on. Mill III had only one breakage for each 1,268.4 rails charged up against it, and yet the tonnage reported for it was less than half as great as the tonnage reported for either Mill I or Mill II. There is no apparent relationship between the quality of the rails being made by the different mills and the sizes of the orders that they have received. It seems improbable that the mills give their traffic to the railways regardless of their rates or service. If they did, the traffic managers of the steel companies would soon be looking for new jobs.

A glance at these figures is enough to show that they tell a very different story from those for the Harriman Lines given by Mr. Isaacs in the letter we published December 29. Mr. Isaacs said: "The number of rails breaking during the first year of service (on the Harriman Lines) which is their critical period under traffic, has fallen in that time (three years) from about one rail in 370 to one in 3,670, with an increase in tonnage, and but for an unfortunate manufacturing error, which was very soon discovered, it would have approximated one rail in 7,000." The foregoing statistics showing only, on the average, 714.4 rails in track for each breakage, indicate that the experience of the Harriman Lines is not typical, but exceptional.

The figures indicate that the greatest numbers of breakages in proportion take place in the larger sections, which seems to demonstrate that the buying of heavier rails is not yet proving a remedy for this trouble. The showing made by the higher priced open hearth rails is much better in proportion than that made by the Bessemer rails, but probably only very general conclusions can be drawn from the data given, because of its incompleteness. For example, it includes no facts throwing light on the conditions of operation under which the rails were used. Mr. Isaacs, in the letter already mentioned, described the method employed by the Harriman Lines in reporting rail failures. If all of the railways of the United States would use a similar method in securing reports of broken rails and transmitting them to the American Railway Engineering Association, and would let that association make them public, information would be available which would really show what results the railways are getting from rails and why they are getting them.

The editorial previously printed in this paper on the rail question has been widely quoted in the press, and has been interpreted as implying that there is "collusion" between the railmakers and the railway managers which results in the railways buying poor rails. The fact is that committees of the American Railway Association and the American Railway Engineering Association have been negotiating for several years with representatives of the steel companies to get improved rails. It has been a hard fight, but they have made some progress. The attitude of the steel manufacturers is much more conciliatory and they are showing a stronger disposition to co-operate now than in past years. But when one considers the fact that, to a very large extent, the same men are dominant financially in the steel and iron manufacturing industry and in the railway business one feels less gratification at the progress that has been made than disappointment that it has not been greater. If the big financiers who are largely interested in both the steel business and the railways should say to the United States Steel Corporation and the other steel companies that they must make the railways good rails at reasonable prices the roads probably would get better rails than they now are getting, and at reasonable prices. And the testimony of E. H. Gary before the Stanley committee is a recognition on behalf of the big men in the United States Steel Corporation, at least, that it is just as much their duty to seek to make good rails at reasonable prices for the railways as it is the duty of the railway managers to seek to get good rails at such prices. Judge Gary said that large industrial concerns such as the Steel Corporation should be subjected to administrative regulation somewhat similar to that applied to the railways. This involves recognition by him and by those whom he represents that the Steel Corporation is essentially as much a concern engaged in rendering a public service as are the railways. Now, the law and their duty to the public require the railways to give safe transportation at reasonable rates; and, to a considerable extent, on the kind of rails they get, and the prices at which they get them, depend the safety of the transportation that they can give and the rates that they must charge for it. The Steel Corporation cannot better justify its existence than by furnishing the railways better and safer rails at lower prices than they could hope for under competitive conditions; and if there is any evidence that it has been, or is, doing so, the best use to which it could be put would be to make it public.

Letters to the Editor.

A SUGGESTION FROM A MECHANICAL MAN.

December 28, 1911.

To the Editor of the Railway Age Gazette:

Your editorial and the resultant comments on the subject of "present giving" by seller to buyer are most timely and most encouraging to the right thinking. One of your correspondents regrets that the discussion was not started a longer time before Christmas, that greater good might have resulted.

This reminds me that now would be a good time to make a suggestion about the giving of some gifts that takes place at Atlantic City each year. Some wise action has already been taken by the supply men regarding souvenirs that have outward and visible form. It is the inward and invisible ones that I wish to speak about—the kind that are given between 6 p. m. and 6 a. m. Can't these be cut out, also? I have heard that certain supply firms have men for this particular kind of entertainment, but I don't believe it. Do you?

While we are cutting out gifts at Christmas and souvenirs at the conventions, let's also cut out this other kind.

MECHANICAL MAN.

ABUSE OF THE PASS PRIVILEGE.

Pittsburgh, Pa., Dec. 29, 1911.

To the Editor of the Railway Age Gazette:

One of the greatest evils on the railways today is the abuse of the pass privilege. In many business concerns employees are given goods at cost, but never free. There was a time when free transportation to railway employees was indirectly considered part of their salary, but this claim can no longer be advanced, as railway employees are paid as well as, if not better than, employees in other service.

A low rate, not necessarily cost, would cure the abuse. This rate should be so low that no employee would hesitate for a moment, on account of expense, to make any pleasure or business trip, but high enough to stop the "joy riding." For example, the commutation rate for employees should be about ¼ cent a mile within a radius of 20 miles, any one traveling more than 20 miles to and from work is either not getting his proper rest or is not giving his duties the proper attention. The through rate for employees should be about ½ cent a mile. This would make the round trip rate between New York and Chicago about $10. Between Pittsburgh and New York and return, and between Buffalo and Chicago and return, it would be about $5. From New York to San Francisco and return the rate would be $30. The round trip over any division would cost between $1 and $2. This would be a very small percentage of the total cost of any business or pleasure trip.

Mileage books would be the best form of transportation, the present pass regulation to govern.

The two important points are: First, there should be a ticket for every mile traveled, either for business or for pleasure. Second, travel by those officers and employees whose railway duties require traveling should be free from expense. Free mileage books should be furnished, the official's travel being governed by his own judgment and duties, and the employees's free travel being governed by his superior.

For its educational advantages, travel by all employees should be encouraged, and intelligent handling of this transportation question is important.

YARDMASTER.

A bill has been introduced into the congress of Bolivia providing for the sum of $6,000,000 to be set aside for the construction of the La Paz-Puerto Pando railway. The bill further provides that this amount shall be used exclusively for building that line, which shall not be transferable to any other railway.

EFFECT OF COLD WEATHER ON TONNAGE RATING.*

BY EDWARD C. SCHMIDT,

Professor of Railway Engineering, University of Illinois, Urbana, Ill.

Any method of tonnage rating should recognize the three important variables which modify train resistance,† namely, speed, average weight of the cars, and air temperature. The influence of the third variable, air temperature, may be as great as that of either speed or car weight, and it is proper that it should have received as general consideration in establishing winter ratings as it has. The railway engineering department of the University of Illinois has been experimenting along these lines for the past two years, and although the tests are still far from being completed, the work has gone far enough to develop some rather interesting results. The influence of cold weather in increasing total train resistance is greater than its influence on the tractive effort of the locomotive.

At the speeds at which freight trains pass ruling grades the net resistance is composed almost entirely of the resistance developed at the wheel rim and the resistance developed in the car journals. The former is called rolling resistance and the latter journal resistance. Whether the rolling friction is greater or smaller in cold weather need not concern us here, for it is altogether likely that at the speeds prevailing at ruling grades

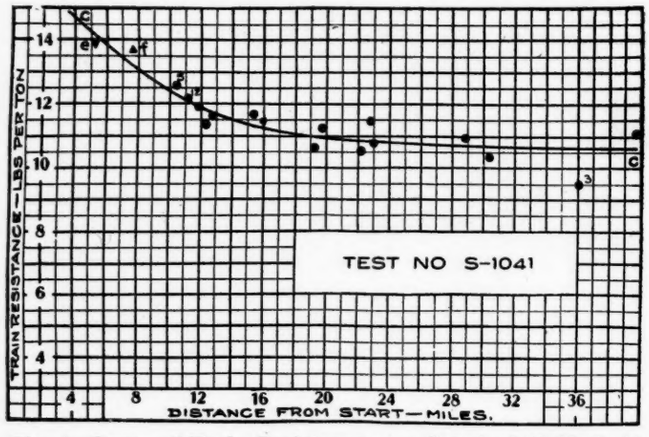

Fig. 1—Curve of Train Resistance at a Speed of 15 M. P. H. for Temperatures Between 30 and 42 Deg. F.

this rolling resistance is much less than the journal friction. In the journals of a car which has been standing for some time, the oil film will be broken through and the journal and brass will probably be in direct contact. As the car starts and the journal turns, oil is brought up from the waste below and the film of oil begins to establish itself. Until this oil film is established over the whole journal the friction is high and gives rise to the great starting resistances which prevail at this time. Low air temperature not only makes the oil more viscous but lengthens the period during which the film is being established. The temperature of the bearing will increase until the rate of heat production within the bearing equals the rate at which the heat is dissipated from the box and other parts, such as the axle. To maintain a certain rate of dissipation of heat the journal temperature may be lower in cold weather than in warm weather. Therefore the minimum resistance attained in cold weather is greater than in warm weather.

Two years ago tests were made in summer weather to determine the influence of car weight on resistance and the results were published in Bulletin 43 of the Engineering Experiment Station of the University of Illinois. The first test in cold weather was made on October 31, 1908, and the air temperature

*Abstract from a paper presented before the Central Railway Club, January 11. Copyrighted by the Central Railway Club, 1911. Reprinted by permission.

†Throughout the paper, train resistance means the force needed to keep the train moving at uniform speed on straight, level track and in still air. This force is expressed in pounds per ton of train weight.

varied from 30 deg. F. at the beginning to 42 deg. F. at the end of the test. As at first plotted, there seemed to be no definite relation between resistance and speed for this test, the resistance values, for speeds in the neighborhood of 15 m. p. h., varying from 8.9 to 12.6 lbs. per ton, and similar variations occurred at other speeds. If cold weather causes these variations, it does so through its influence on journal temperature. It was conceived, therefore, that the variations were due to differences in journal temperature, and that these differences were, in their turn, due to the fact that most of these values were taken while the journals were warming up.

If the journal temperature was varying, it must have been increasing as the train moved further and further from the starting point, and it was concluded that if, for each point on the road at which resistance had been determined, its value were plotted with respect to the distance of that point from the beginning of the run, such a plot would reveal a regular variation of resistance with the distance due to the influence of the distance upon journal temperature.

All resistance readings taken between 14 and 16 m. p. h. were plotted as in Fig. 1, in which vertical distances denote resistance, and horizontal distances represent miles run from the starting point. The points which have the highest resistance values are found near the beginning of the run, whereas those having the

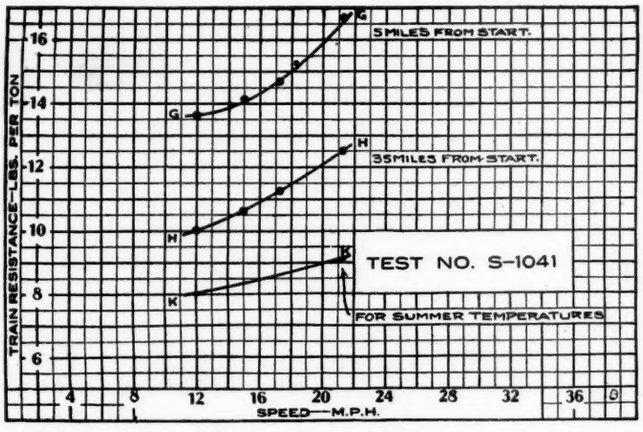

Fig. 2—Showing Resistance in Cold Weather and Summer Weather.

lowest resistance values fall at the end of the run, and in general the points so arrange themselves that their resistance values constantly decrease as the distance increases. Bearing in mind the facts that all values apply to the same train and to approximately the same speed, it is apparent that neither variations in car weights nor variations in speed can account for the regular decrease in resistance shown. This decrease must therefore be due to the only remaining variable which exerts any important influence upon resistance, namely, journal temperature. It is therefore assumed that the regular decrease in resistance as the train progresses is due to the fact that the journal temperatures are constantly increasing and that oil viscosity and journal resistance are therefore diminishing. This assumption underlies the further discussion of this and of the following figures. The test conditions* made it difficult to directly measure the temperature of the journals in the train and the results are therefore presented in terms of distance run by the test train. The journal temperatures are intimately related to this distance unless the test is run under widely varying speeds.

The curve *CC* drawn in Fig. 1 represents approximately the rate at which resistance changes with distance run, and it applies to a speed of about 15 m. p. h. It is apparent from this curve that the resistance at the beginning of the run is about 14 lbs. per ton at this speed and that it constantly decreases until the train has progressed about 35 miles, at which point the resistance reaches its minimum value of about 10.5 lbs. per ton and the journal temperature reaches its maximum. Trains of like character when run at similar speeds in warm weather reach their minimum resistance within the first 8 or 10 miles of their run, and their minimum resistance is less than that attained in the train whose performance is exhibited in Fig. 1.

From further analyses of the results it was found that for speeds of 21.3, 17.3, 15 and 12 m. p. h., the minimum resistance is reached at about 35 miles from the beginning of the run.

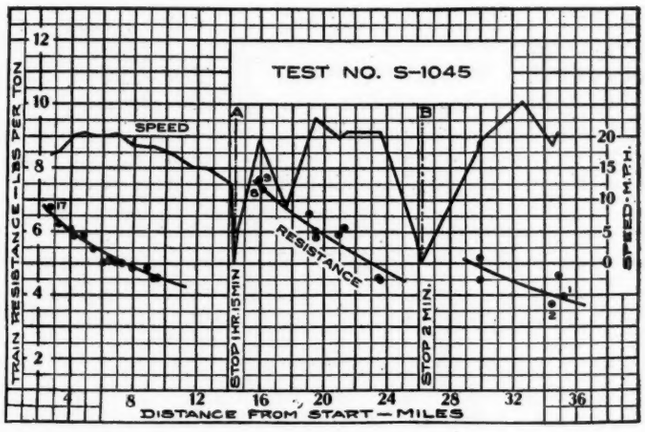

Fig. 3—Resistance Curves Showing the Influence of Stops in Cold Weather.

From curves for speeds of 21.3, 17.25, 15 and 12 m. p. h., plotted in the same manner as in Fig. 1, the curves in Fig. 2 were drawn. The corresponding values of resistance and speeds at 35 m. p. h. constitute the co-ordinates of the four points shown on the curve *H*, of Fig. 2, and serve to define this curve. The curve *G*, for 5 m. p. h., is found in the same way. The vertical distances represent resistance and horizontal distances represent speed, the curves *G*, and *H* represent, therefore, the variations of resistance with speed for test 1041, and present train resistance curves in their usual form. This test was made when the air temperature

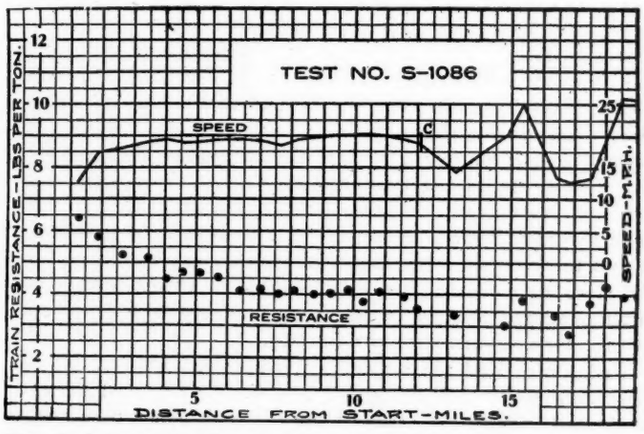

Fig. 4—Resistance Curve of Train of Heavily Loaded Cars.

varied from 30 deg. F. to 42 deg. F., and when the wind was light. The train was composed of cars weighing, on the average, 17.2 tons.

In order to compare the resistance shown by curves *G* and *H* with the resistance prevailing in warm weather, the curve *K* is drawn. This curve shows the approximate resistance in summer weather of a train composed of cars weighing 17.2 tons. The curve *K* is therefore comparable with either *G* or *H*. Curve *H* represents resistances which are approximately 25 to 30 per cent. greater than those represented by curve *K* and we

*The trains tested were freight trains of the Illinois Central, accepted as they came in the regular service. It has not proved feasible, thus far, to directly measure the temperature of any of the journals of the cars composing these trains.

may conclude that for the train of test 1041 even the minimum resistance attained after the train had run 35 miles is about 25 per cent. greater than the resistance of a similar train in warm weather. Whether the change from summer temperatures to a temperature of 30 deg. F. will always result in an increase of 25 per cent. in the resistance does not appear, and the data in hand do not as yet warrant generalizations of this sort. Attention is called to the fact that the term resistance as here used means resistance on level track, and consequently a difference of 25 per cent. in resistance does not necessarily require a difference of 25 per cent. in tonnage rating. This statement is developed beyond.

Fig. 3 is similar to Fig. 1, and it leads to similar conclusions. It applies to test 1045 during which the air temperature varied from 22 deg. to 26 deg., and for which the train was composed of cars averaging 49.2 tons in weight. In Fig. 3 the speed during the run is indicated by the line in the upper part of the diagram. It will be noticed that the train was brought up to a speed of about 20 m. p. h. within the first 3 miles of the run and that the speed was thereafter maintained at approximately 20 miles, except in the immediate neighborhood of the two stops which are indicated at *A* and *B*. The speed for all but four of the points for which resistance is calculated lies between 18 and 21 m. p. h., and the speeds for these four points lie close to this range. Since the speed is so nearly uniform for all these points, its influence in modifying resistance is practically eliminated, and such changes in resistance as are indicated on the diagram are chiefly due to changes in journal temperature. At point *A* about 14 miles from the start, the train was stopped for one hour and 15 minutes, the air temperature at that time being 23 deg. F. Again at *B*, 12 miles farther along, a stop of two minutes' duration was made. It is interesting to note the effect of these stops upon the resistance. The resistance in the beginning is in the neighborhood of 7 lbs. per ton. It steadily decreases as the train progresses, until at the point *A*, where the train was first detained, it had fallen to about 4 or 4½ lbs. Upon leaving *A* the train's speed was immediately raised to its general value of 20 m. p. h., and the resistance is found to have risen again to about the same value which it had at the original starting point. From there on, the resistance again decreases steadily until the point *B* is reached, after which there is a slight increase in resistance due, probably, not so much to the 2-minute stop as to the cooling of the journals during the considerably longer period in which the speed at this point was low, while the train was approaching and leaving *B*. The diagram serves well to show how important the effect of such a stop as that at *A* may be. If the ruling grade in this case had occurred just beyond *A*, it is entirely likely that the increased train resistance would have stalled the train at that point. There is no evidence in this diagram that the minimum resistance of this train at this speed is reached during the test. Indeed, if the resistance curves there drawn are accepted as correct, it seems clear that the stops have delayed the establishment of this minimum resistance beyond the test limits. Comparison with resistance in warm weather is therefore unwarranted.

During test 1084 the air temperature varied from 1 deg. F. below zero at the beginning to 5 deg. F. above zero at the end of the test. These temperatures are lower than any others prevailing during the tests here discussed. The speed during this test was increased from 8 m. p. h. near the start to 20 m. p. h., at which it was maintained uniform. The resistance values derived for the first 10 miles of the run are not numerous enough to offer much information. The resistance at 10 miles from the start was 20 lbs. per ton, and decreased at 24 miles from the start to about 16 lbs. per ton, and probably would have continued to decrease had the test been continued beyond this point. The normal resistance in summer weather for a train of this car weight (16.5 tons) is 9.5 lbs. per ton. The train of this test has, therefore, a resistance 68 per cent. in excess of the normal, even after running 24 miles. Part of this excess is doubtless due to the fact that a rather strong wind prevailed during the test; most of it, however, is probably due to low temperature.

Fig. 4 applies to test 1086, during which there were very light winds and the air temperature varied between 28 and 30 deg. F. The test train was composed of cars whose weights averaged 59.5 tons. The points shown were taken between the speed limits of 12.5 and 26 m. p. h. The resistance value for each point lying within these limits is plotted with respect to the distance of this point from the start. The upper line represents the speed, which was quite uniform and near 20 m. p. h. for the first 12 miles of the run. Beyond this point the speed varied considerably. As in the tests previously discussed, the resistance decreases with great regularity during the first 12 miles, until at *C* the journals have apparently attained their maximum temperature for a speed of 20 m. p. h., and the resistance has reached its minimum value for this speed. Beyond *C*, therefore, the influence of journal temperature upon resistance largely disappears and the resistance thereafter responds, in its variation, quite definitely to changes in speed.

One other fact developed by Fig. 4 merits consideration. It has been noted that in this case the maximum journal temperature was attained after running only 12 miles. This is a shorter run than was necessary to thoroughly warm up the journals in the other trains here discussed. These trains differ from the train of test 1086 in having lower car weights and the explanation probably lies in this fact. It seems likely that the greater load on the journals in test 1086, and the consequent greater heat production within the bearings has caused their temperature of equilibrium to be attained sooner in this test.

EFFECT OF GRADE ON TONNAGE REDUCTION.

It was stated above that an increase in net train resistance, of say 30 per cent., due to low temperature, does not necessarily require a like reduction in train tonnage. This is due to the facts that net train resistance, which here denotes merely the resistance on level track, is not the only resistance which absorbs the tractive effort, and that the other resistances are unaffected by temperature.

The process of rating locomotives consists essentially in specifying a train whose gross resistance shall equal the available tractive effort. Since ratings are made to meet the conditions which exist at the ruling grades, this gross resistance must always consist of net resistance, as above defined, and of grade resistance.* Of these two elements, the grade resistance is almost always the greater. Obviously neither air temperature nor any other external condition can affect the grade resistance, which is modified only by difference in grade. Since the larger element of gross resistance remains unaffected, the reductions in rating in cold weather need not be as great as the variations which cold weather causes in the smaller element of gross resistance, that is, in the net train resistance. Neither are these tonnage reductions the same for different grades. An example may serve to make this clearer.

Assume that it be required to find the summer and winter ratings for a certain class of locomotives on two divisions of a road, which we here designate as division *A* and division *B*. The ruling grade on *A* is one-half per cent. and that on *B* is 1 per cent. The resistance due to grade alone is 20 lbs. per ton of train weight for each per cent. of grade, and the grade resistance on division *A* is therefore 10 lbs. per ton, while on division *B* it is 20 lbs. per ton. Now assume also that the net train resistance for the desired speed is 4.5 lbs. per ton in summer and that in winter it is 33⅓ per cent. greater, namely 6.0 lbs. per ton. We assume further that in summer the available tractive effort on grade *A* for the class of engines under consideration is 32,000 lbs., and on grade *B* 30,500 lbs. If the effect of cold weather upon the engine itself be assumed such as to

*Acceleration and curve resistance may also be components of this gross resistance. They are, however, ignored here, since their consideration is not necessary to the argument, although their presence may modify its conclusion.

cause a reduction of 5 per cent. in tractive effort, we find the available tractive effort in winter to be 30,400 lbs. on division *A* and 28,970 lbs. on division *B*. We have now available enough information to calculate the tonnage ratings. On division *A*, for example, the gross resistance in summer is 10 + 4.5 = 14.5 lbs. per ton, the tractive effort is 32,000 lbs., and the tonnage is consequently 32,000 ÷ 14.5 = 2,207 tons. The winter tonnage on division *A* is 30,400 ÷ (10 + 6.0) = 1,900 tons. The proper winter tonnage on division *A* is found therefore to be (2,207 — 1,900) ÷ 2,207 = 14 per cent. less than the summer tonnage. Similarly for division *B* the tonnage reduction for winter weather is found to be 10 per cent. The results of these calculations are summarized in the following table:

	Division A.	Division B.
Ruling grade—per cent.	½	1
Tractive effort in summer.....lbs.	32,000	30,500
Tractive effort in winter.....lbs.	30,400	28,970
Grade resistance.....lbs. per ton.	10	20
Net resistance in summer.....lbs. per ton.	4.5	4.5
Net resistance in winter.....lbs. per ton.	6.0	6.0
Gross resistance in summer.....lbs. per ton.	14.5	24.5
Gross resistance in winter.....lbs. per ton.	16.0	26.0
Tonnage in summer.....tons	2,207	1,245
Tonnage in winter.....tons	1,900	1,115
Tonnage reduction.....per cent.	14	10

It is apparent from these calculations that an increase in net resistance of 33⅓ per cent. necessitates a reduction in rating on division *A* of only 14 per cent., and on division *B* this reduction need be only 10 per cent. Not only are the tonnage reductions in both cases considerably less than the difference in net resistance, but the reductions are different on the different grades. The greater grade requires the smaller tonnage reduction. If the ruling grades on a particular road do not differ greatly on the different divisions, it would be an unnecessary refinement of practice to discriminate between divisions in establishing tonnage reductions for winter weather. If, on the other hand, a road runs in both level and mountainous country, it is not only logical but economical to make such distinctions.

There are a few roads operating almost exclusively in mountain territory which find it unnecessary to make reductions in rating for low temperatures. The ruling grades on these roads are, of course, heavy. The foregoing example illustrates how the effect of heavy grades may disguise and almost nullify great variations in net resistance, and it offers therefore, some justification for the practice which ignores distinctions between summer and winter ratings in such territory.

CURRENT PRACTICE.

A considerable amount of information has been collected from the railways of the country concerning their tonnage rating practice. This information is presented in the accompanying table. It is believed that the table fairly represents, in most cases, the practice of the various roads as stated by their own officers. It has, however, been found difficult to force into the form and limits of the table all the information available, and in a few cases the tabular statement scarcely represents all the facts. It is hardly possible to indicate in the table the degree of authority given on these roads to trainmasters and despatchers, under which they may vary from the usual practice.

The roads are arranged in the table in the order of the air temperature limits which determine the normal rating. This arrangement was adopted because it makes easier the direct comparison of figures appearing in the later columns. At the same time, it brings together roads which operate in a very different territory and under very different weather conditions, and these facts should be borne in mind in making comparisons. Examination of the table makes it evident at once that there is great diversity of practice. Not only are different tonnage reductions made for similar temperatures, but the range in temperature which is considered to warrant tonnage reduction varies from a few degrees to 30 or 40 deg. Most of the differences in practice are not surprising when it is considered that the roads included, represent practically the entire United States and Canada and represent, therefore, the greatest variety in weather conditions. Most of the differences in practice disclosed by the table are quite sufficiently explained by the differences in the weather conditions prevailing in the territory served.

TONNAGE RATING — SUMMARY OF CURRENT PRACTICE.

Road.	Minimum temperature for normal rating. Degs. F.	Tonnage Reductions for Various Temperature Conditions.								Additional reductions for unusual conditions.
		Temperature range.	Reductions per cent.	Temperature range	Reductions per cent.	Temperature range.	Reductions per cent.	Temperature range.	Reductions per cent.	
Chicago Great Western	*45	45-25	8	25-0	16	0 & below	25			†8 per cent.
Chicago & Eastern Illinois	45	45-32	10	32-15	20	15-0	30	0-10	35	
Chesapeake & Ohio	45	For each 10 deg. change in temperature make 5 per cent. reduction.								Special orders.
Boston & Albany	40	A reduction of from 50 to 150 tons is made from summer rating for winter rating.								Special orders.
New York Cent. & H. R.	50	More or less discretionary. For a drop of 20 deg. reduce about 10 per cent.								Special orders.
Central R. R. of New Jersey	40	40-20	10	20-0	20					Special orders.
Pittsburg & Lake Erie	40	40-20	210 ts	20-10	420 ts	Zero	640-860 ts			Special orders.
Baltimore & Ohio	35	From 35 degs. to zero and below make reductions of from zero to 30 per cent.								Special orders.
Erie	33	33-23	5	23-13	10	13-3	15	Below 3	20	Special orders.
Del., Lack. & Western	32	Make 10 per cent. reduction for temperatures below 32 deg. and 15 per cent. reduction for extreme conditions.								
Wabash	32	**Governed by Special Orders.**								Special orders.
Norfolk & Western	30	At 30	50-100 ts	30-20	100-150 ts	20-10	200-250 ts	10-0	300-350 ts	Special orders.
Chi., Bur. & Quincy	*30	*30-0	10-15	*Below zero	15-20	†30—0	15-20	†Below zero	20-30	††10-15 per cent.
Chi., Mil. & St. Paul	30	**30-20**	**5**	**20-10**	**10**	10 to —10	20	—10 to—20	30	Special orders.
Chi., St. P., Minn. & Omaha	30	30-10	10	10 to —10	15	—10 & lower	25			Special orders.
Great Northern	25	‡25-5	10	5 to —10	20	—10 & lower	25			Special orders.
Chicago & North Western	20-25	Below 25	10-25							Special orders.
Duluth & Iron Range	25	25-0	10	Zero to —10	20	Below —10	25			Special orders.
Lehigh Valley	25	About 5 per cent. Reduction for each 10 deg. drop in temperature.								
Boston & Maine	15	15-0	7-15	1 to —15	12-18	—16 to—30	17—22			‡7-15 per cent.
Central Vermont	Zero	From zero to 35 degs. below reduce 150 tons for each 8 deg. drop in temperature.								Special orders.
Grand Trunk Pacific	Zero	0 to —5	5	—5 to —10	10	—10 to —15	15	—15 & lower	20	Special orders.
Intercolonial of Canada	Zero	Make reduction of 100 tons for temperature below zero.								Special orders.
Chi., R. I. & Pac.	Zero	Make 20 per cent. reduction for temperature below zero with no wind and 25 to 30 per cent. with heavy winds.								‡10 per cent.
Denver & Rio Grande	Zero	0 to —10	10	—10 to —30	20					Special orders.
Colorado & Southern	Zero	0 to —25	10 to 25							Special orders.
Big Four	Governed by special orders.									Special orders.
N. Y., New Haven & Hartford	Matter left to division officers.									
Grand Trunk	Matter left to division officers.									
Pere Marquette	Bad storms and very cold weather, 20 to 30 per cent. reduction.									
A. T. & S. F. Coast Lines	No reductions except on Albuquerque Div., where reduction of 100 tons is made in winter.									Special orders.
A. T. & S. F. Eastern Lines	Governed by special orders.									Special orders.
St. Louis & San Francisco	Matter left to sub-division officers.									
Northern Pacific W. of Paradise, Mont.	Matter left to division officers.									
Southern Pacific	No reduction.									Special orders.
Kansas City Southern	No reduction.									Special orders.
El Paso & Southwestern	No reduction.									
Seaboard Air Line	No reduction.									Special orders.
Atlantic Coast Line	No reduction.									
Virginian	No reduction.									
Oregon Short Line	No reduction.									

*Light or no wind. †Heavy wind. ‡Bad rail.

COLLATERAL TRUST BONDS.

BY WILLIAM Z. RIPLEY,
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Collateral trust bonds, so called, constitute by far the most important type of funded indebtedness, next to the ordinary simple mortgage. Approximately one-ninth of the total borrowings of the railways of the United States in 1908 assumed this form. This is the more notable, as this huge volume of more than a billion dollars, is in large measure the creation of the decade since 1900. It is indubitable that without this expedient, few if any of the great railway consolidations could have taken place. Certainly the holding company as a means of effecting combination could never have been employed.

A collateral trust bond differs from the ordinary bond in that it is a mortgage secured, not by any real property or franchise, but by the deposit with a designated trustee of stocks or bonds of other companies. Its lien upon actual property therefore is not immediate but indirect, through the medium of such other securities as are thus deposited as collateral. The collateral trust bond, moreover, depends for its interest upon such revenues as may accrue from these stock or bond holdings, together with such additional guarantee as the issuing company may find it expedient to give. A concrete illustration will make the practice clear. In 1902, 306,000 shares of the Louisville & Nashville out of a total of 600,000 shares, as a result of an untoward speculative raid, was turned over to a much smaller company, the Atlantic Coast Line Railroad. This latter road, thus assuming control by ownership of a majority of the stock, paid for the purchase by an issue of $35,000,000 of its own collateral trust bonds, together with certain other considerations in cash and securities. These Atlantic Coast Line bonds bore 4 per cent. interest and constituted a mortgage upon the Louisville & Nashville shares. These shares were in fact deposited with a trustee for that purpose. It is evident that the Atlantic Coast Line independently could never have issued bonds to this large amount, it being nearly three times the entire capital stock ($12,600,000) of the company. But the bonds, calling for an interest charge of $1,400,000 annually, were to be supported by the dividends of $1,530,000 upon the purchased stock. It was anticipated of course that the enhanced earning power of the conjoined companies would still further guarantee the success of the issue. At the outset this plan, including the additional consideration given, netted a heavy loss to the issuing company; but in the course of a few years, increased dividends upon the deposited stock brought about a large direct profit, aside from the operating advantages.

The first use of the collateral trust bond dates from the early history of the Union Pacific. In 1873 Congress, in order to protect its heavy loans to the company, prohibited by law any further increase of the bonded indebtedness of the road subject to its lien. This greatly embarrassed all projects for expansion through construction of either branch lines or extensions. To finance these by means of small independent companies was out of the question. Small companies could not successfully sell bonds, nor would it be wise to lose control of them; consequently the Union Pacific advanced funds for construction, taking the stocks and bonds of the new companies in payment. Its treasury was then reimbursed by the issuance of the 6 per cent. collateral trust bonds of 1879, secured by the deposit of these securities. Thus the needed extensions were built without violating the letter of the federal prohibition.

The foregoing illustration indicates the earliest, and for a long time, the most important reason for the resort to collateral trust bonds. Indeed in a country divided into so many independent states, it is difficult to see how much of our construction could have been effected otherwise. Most charters issued by states authorize construction only within certain strictly defined territory. Subsequent extensions can be legally made only by means of new charters or amendment of the old one. The latter expedient may require modification of original liberal charter rights. It is safer to organize new and independent corporations. Moreover, of course, construction beyond state boundaries must of itself entail the formation of a separate company with a charter of its own. None of these new and subsidiary companies can be successfully financed by themselves. It is more profitable that the necessary funds should be procured by the parent road. Its bonds or stocks will sell to far better advantage in distant markets. The undoubted advantages in this plan have led to its adoption by most of the large companies, notably the Union Pacific, Atchison, Burlington, and Rock Island roads in the West; and the Louisville & Nashville and Illinois Central in the South.

In recent years, particularly since the resumption of general prosperity in 1897, the collateral trust bond has been largely utilized as a means for financing the consolidation of railways. To the holding company as a mode of combination, it is in fact indispensable. The New York Central & Hudson River after 1898 acquired control of the Michigan Central and Lake Shore by the exchange of its own collateral trust bonds for the stocks of these roads deposited as collateral. Among many similar operations within the last decade, one of the most notable was the joint purchase of the Burlington road in 1901, by the Great Northern and Northern Pacific companies. In this case the bonds became a joint obligation of both companies, being secured by the deposit of their Burlington stock as collateral. The variations of procedure are many. Control of another road may first be acquired by purchase for cash, with subsequent reimbursement through mortgaging the securities purchased. This was a common mode prior to 1900; but was obviously open only to strong companies with ample cash resources. Another mode would be the direct exchange of the new collateral trust bonds for the desired stocks or bonds to be acquired. This method has been largely utilized in building up the Rock Island system. Or a third method may be adopted; namely, first to procure the necessary funds by sale of the collateral trust bonds, and then with the proceeds engage in the necessary business.*

The collateral trust bond, as used in acquisition of securities of other companies, is precisely analogous to "margin" operations by individuals upon the stock exchanges. Its advantages and dangers to individuals and corporations are precisely alike. There is no difference whatever in principle. Payment in full in cash for purchases of securities, ties up a large amount of capital indefinitely. Both principal and interest are lost, being offset only by the income derived from the stocks or bonds acquired. But if such operations can be based not upon cash but credit, an indefinite expansion of the scale of operations becomes possible. The property acquired, as Mitchell observes, pays its own purchase price. It is a great economizer of funds. Thus E. H. Harriman in 1896 obtained control of $10,000,000 par value of Illinois Central stock with an outlay of less than $1,500,000 of Union Pacific cash. The stock paying 5 per cent. dividends was bought by an issue of bonds bearing only 4 per cent. In other words bonds could be sold on sufficiently good terms to pay even the necessary premiums on the stock, and entail little if any burden upon the parent company.

As a means of railway consolidation, the collateral trust bond has certain well defined merits. The most notable is its elasticity. Whereas actual mergers and even long term leases are practically indissoluble; a control by means of stock ownership, financed through an issue of collateral trust bonds, may be readily enough terminated by selling the stock and retiring the bonds with the proceeds. Thus, when in 1909, the Rock Island system found the St. Louis & San Francisco road too heavy a financial burden, the connection was severed by simply retiring the collateral trust bonds through the sale of "Frisco" stock. This stock was the only tie between the two roads. Sometimes, however, with additional complications in the nature of guaranteed

*These plans are fully discussed by T. W. Mitchell in *Quarterly Journal of Economics*, May, 1906, pp. 445-467.

dividends, leases, and preferred shares, as in the Union Pacific tangle about 1908, this remedy is extremely difficult to apply. The much discussed segregation of assets of the Union Pacific by means of a holding company was impossible at that time for these reasons. On the other hand the collateral trust bond may readily become a source of danger where it imposes a heavy burden of fixed charges upon a company. Most of the early issues of this sort down to 1901 were based upon the deposit of bonds of subsidiary companies. The New York Central-Lake Shore collateral trust bonds in 1898 and the Burlington joint 4's three years later started the fashion of issuing such securities not upon bonds as collateral, but upon deposited stocks. This change was undoubtedly due to a shift of the main purpose for which such bonds were put forth. Instead of being used for the extension of existing lines into new territory they were used for purposes of consolidation. Fixed charges were thus created for the parent roads, which were supported not by assured, but only by contingent, income—income contingent, that is to say, upon its being earned by the companies whose stocks were deposited.

The most serious danger lurking in the collateral trust bond, however, is its invitation to corporate speculation and overextension of credit. The ease with which a strong company may engage in stock market operations on a large scale by such means is most clearly demonstrated by the experience of the Union Pacific road between 1901 and the death of Mr. Harriman in 1909.* The cost of its investment in Northern Pacific stock, subsequently converted into Northern Securities Company's stock was about $76,900,000. This had been financed by means of collateral trust bonds for the most part based upon operations of the Southern Pacific road, also within its control. The profit in hand and on paper when these operations were closed out amounted to about $82,900,000 or 113 per cent. These profits it will be noted, as described more in detail elsewhere, were promptly reinvested in stocks of other roads all over the country. But the new purchases were made at the high prices prevailing before the panic of 1907; and, although largely increasing its revenue, could not have been closed out without losses quite commensurate with the previous gains. But in the latter case it may be urged that the stocks acquired were *bona fide* investments, paid for in full from cash in hand. On the other hand, the large sums due the Union Pacific by the Oregon Short Line which was the cat's paw in these speculative plunges, as appeared in 1910, shows how burdensome was the diversion of funds from their legitimate uses for operating development into the channels of outside investment.

The stock market operations of the trunk lines in their acquisition of the hard and soft coal lines in 1900-06 affords yet further illustration of the amazing development of credit which is possible with the use of collateral trust bonds. The following table shows the amount of these purchases and the paper profits at prices prevalent in August, 1905:

The Pennsylvania group:	Amount Purchased.	*Profit.
Baltimore & Ohio com	$30,293,300	$13,500,000
Baltimore & Ohio pfd	21,480,000	4,200,000
Chesapeake & Ohio	16,000,000	6,400,000
Central of N. J.	14,500,000	8,400,000
Norfolk & Western	32,000,000	16,500,000
Reading com	13,952,000	6,000,000
Reading 1st pfd	6,065,000	300,000
Reading 2d pfd	14,265,000	3,800,000
The Vanderbilt group:		
Lake Shore	50,000,000	50,000,000
Reading com	13,952,000	6,000,000
Reading 1st pfd	6,065,000	300,000
Reading 3d pfd	14,265,000	3,800,000
Big Four	11,224,000	4,400,000
Lehigh Valley	3,200,000	2,500,000
Michigan Central	20,000,000	10,000,000
Chesapeake & Ohio	16,000,000	6,400,000
Miscellaneous:		
Ontario & Western	30,000,000	3,000,000
Soo Line, com	7,066,000	9,500,000
Soo Line pfd	3,533,000	5,000,000

*Estimated.

*Succinctly set forth in *Quarterly Journal of Economics*, August, 1907, pp. 569-612.

These of course are paper profits entirely. Any attempt to liquidate their holdings on any large scale would of course have led to rapidly crumbling quotations. Yet when in 1906 some of these holdings were sold out, the actual profits were large. The Lake Shore was credited with having made an average profit of $30 on about 100,000 shares of Reading stock. On the Chesapeake & Ohio the Pennsylvania Railroad cleared possibly $4,500,000. Its Baltimore & Ohio investment, sold to the Union Pacific in 1906, undoubtedly yielded large gains. These profits undoubtedly went into the great projects for improvement about New York. But suppose that instead of profit, there had been heavy losses, as in fact there were on paper in the case of many purchases made prior to the break of 1907. When the Reading was practically taken out of the market in 1903, its common stock sold for nearly $70 per share (par value $50). Within a year the price fell to $37. Similarly the Union Pacific reinvestments in 1906 of proceeds of its Northern Pacific operations within the next two years registered a loss on paper of many million dollars. Nor can there be question that, as in the case of the New York Central, many of these companies would have been better off, had they devoted these huge sums, tied up in stock market operations, to the prosecution of their legitimate function of transportation. The New York Central certainly, had it had the undivided support of the Lake Shore would not have been compelled to pile up still higher the burden of its capitalization in order to complete its terminal improvements at New York. Not all of these operations were financed by the use of collateral trust bonds. But even if not, capital had to be raised somehow to pay for these purchases. And hardly ever, when the securities have been resold, have the proceeds been used to reduce the capitalization to its former level. The entire development of these years represents a most dangerous tendency. And for its first suggestion as to ways and means, the collateral trust bond must be held largely accountable. Merely because the outcome of these purchases, by means of borrowed money, chanced to have a favorable issue, due to a rapidly rising level of prices, does not in the least detract from the force of the criticism.

Certain other uses of the collateral trust bond may be mentioned. It is commonly employed for the funding of troublesome floating debts. These are usually, however, issued for a short term and are rather of the nature of notes based upon specific collateral. Of far greater general importance is their use in making effective appeal to certain classes of investors. Many conservative people who would never dream of purchasing railway stocks, will trustingly invest in a collateral trust bond whose sole security is the deposit of such stocks. This matter came prominently to the fore in connection with the New York Life Insurance Investigation of 1905. As a result of this examination, the insurance companies were prohibited from investing in stocks of railway or other corporations. The laws of foreign countries also restrict the investments of insurance companies in much the same way. Yet the reserves of these companies may, and undoubtedly do contain, large amounts of collateral trust bonds, based upon stocks as collateral. The mere substitution of a bond for a stock by this means evidently largely widens the market for railway securities.

The *Diario Official* of September 29, 1911, gives the official contract that has been submitted for the consideration of the government of Salvador, covering the construction of a railway from San Salvador to the port of La Libertad, on the Pacific coast. According to the plans this new railway will connect with the line which is already built and is now in operation as far as the city of Santa Tecla. The new line is to be of the same gage, 3 ft., as the existing line. The terms of the contract require that the work must be concluded within a period of two years of the acceptance of the plans by the government, and a subsidy of $11,000 per mile is granted.

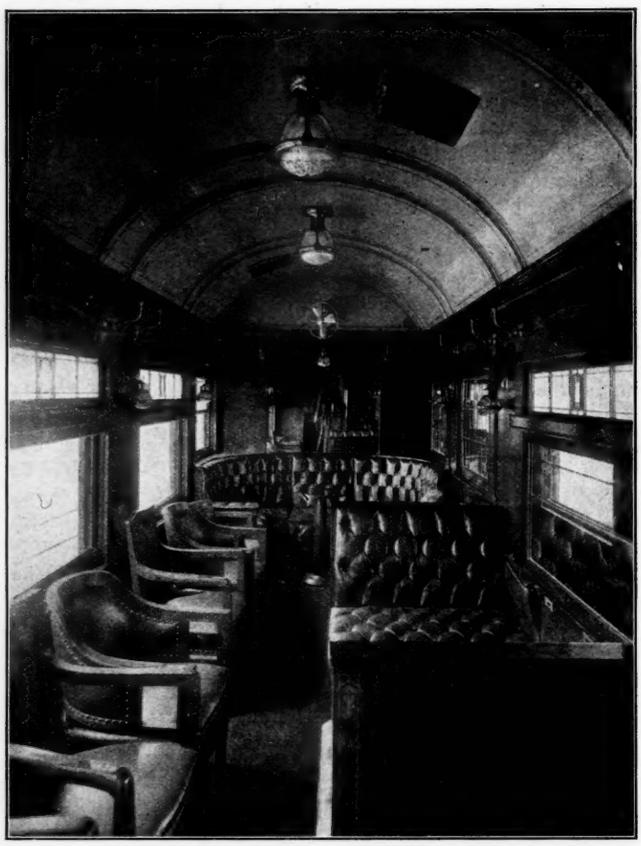
STEEL OBSERVATION CAR FOR THE PANAMA LIMITED OF THE ILLINOIS CENTRAL.

The Panama Limited train of the Illinois Central, running between Chicago and New Orleans, has a daylight trip through both the north and the southland. A steel observation car with a new feature called a sun parlor, specially designed for this service, has been recently added to it. The car was built by the Pullman Company, and has the semi-elliptical roof so generally used by the Harriman Lines. The rear platform, which is usually open on observation cars, is here enclosed, enabling the passengers to view the winter landscape of the north through the protecting glass, while, in the semi-tropical climate of the south, the large sash may be dropped in the side walls of the car, giving the full effect of an open platform. The window sill is hinged so as to cover up the opening; the vertical and horizontal sections of this drop sash and its guides and cover are here illustrated.

There is the usual large parlor with 25 chairs and a wide seat at the end with grill work above. Beyond this is a double writing table and bookcase. In the front end of the car is the smoking room with 20 seats, a toilet and a small buffet. The smoking room is enclosed and has a side door from the aisle. The car is 74 ft. long and weighs 133,100 lbs. without storage batteries; the latter increase the weight about 3,000 lbs., making the total weight in working order, 136,100 lbs.

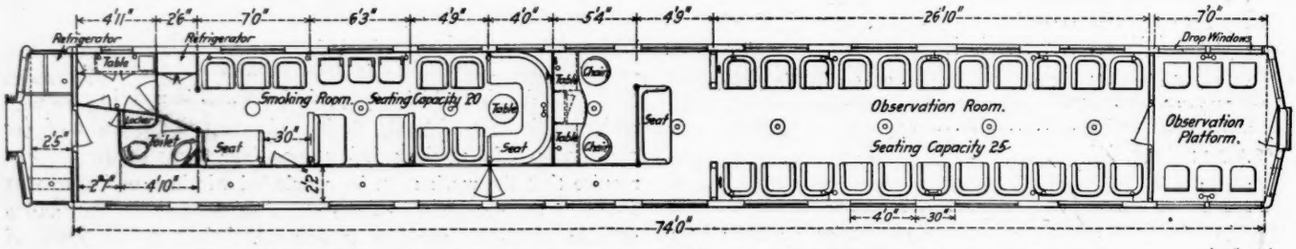
The lighting is by axle light and storage battery; for emergency purposes the cars are fitted with twelve of the Pullman Company's candle lamps. The generator is of the Gould new type B, belted, 40 volts, 3 k. w. The main lamp regulator is situated underneath, while the generator regulator and lamp multiplier are located in the switchboard locker. The battery boxes are of O. H. steel, Pullman Company's standard design, containing 24 cells. The Edison batteries are divided in two portions, and are placed on opposite sides of the car to equalize the weight on the springs.

Looking Toward the Rear End of the Observation Car.



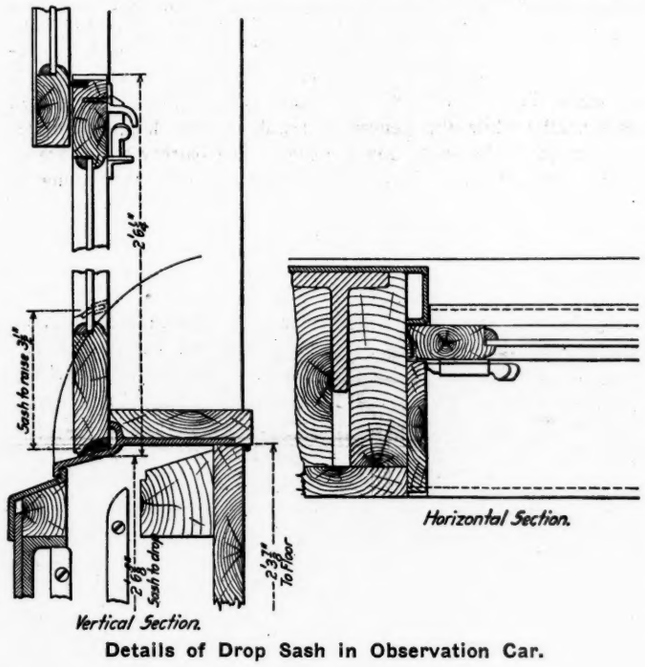
Smoking Room of Observation Car.

The heating is by the vapor system, with the smoking room and sun parlor independent. Each of these two rooms may be cut out from the heating system as desired. The train line consists of 2 in. pipes well covered with magnesia; all inside heating pipes are concealed by brass grills. The ventilation is obtained by ten Garland type C registers. The interior of the sun parlor and body of the car are finished in Cuban mahogany with English oak in the smoking room and quarter sawed oak in the buffet. The cars are fitted with 40 mahogany side frame chairs



Plan of the Observation Car Used on the Panama Limited Train of the Illinois Central.

upholstered in tapestry and Spanish leather. The shades are silk, faced with pantasote, while in the sun parlor they are of



Details of Drop Sash in Observation Car.

monk's cloth. Among the special features provided on these cars is a telephone, U. S. mail box, and electric flat iron and ironing board.

WHY STEAMBOAT TRAFFIC DECLINED BEFORE THE RAILWAY.

BY PAUL W. BROWN.

The completion of the Northern Pacific and the decline of the steamboat trade on the upper Missouri decided the last great campaign in the contest between the American railway and the American river steamer as means of transportation. What has come to pass since that day has been but the realization of a foregone conclusion. The trade on the lower Mississippi yielded to the inevitable much earlier; its "peak" was touched just at the end of the '50's; it never recovered the disorganization of the Civil War. The decade ending with 1880 saw a heavy traffic on the upper Mississippi; the lumber trade was brisk, and the rush to the Red river wheat country caused the upstream boats to draw deep. The Missouri, with its 2,084 miles of navigable channel leading to the very gates of the Rocky mountains, was the last stronghold of river transportation.

Though more than a score of years have passed since the issue was definitely decided, with momentous consequences in the realms of social development, economic progress, finance and even government, no adequate explanation of the victory of the railway over the river carrier has yet appeared. The course of events has been deemed too simple to require extended explanation. Champions of inland waterway navigation and writers on railway development, in polar antagonism on many points, have tacitly agreed that the reason for the decline of river traffic lay on the surface of the event.

When they have proceeded to state that reason, however, they have been far from saying the same thing. There are two standardized explanations of the passing of the steamboat trade, and each is made, with scarce the change of a phrase, many times a year.

The steamboat man and the waterway enthusiast—who, by the way, are not necessarily the same person—assert that it was the total depravity of railway managers which killed the steamboat trade. This is alleged as a sole and sufficient explanation. Steamboat traffic is of necessity limited to certain routes. Railways, we are told, were for years content to do business at a loss on those routes, and recoup themselves by overcharging in districts where there was no waterway competition, in order to strangle the steamboat trade. They gave rebates, issued passes, cut rates, bought up water terminals. They purchased boats, and either laid them up to rot, or made rates so high that no business fell to them. Their work was insidious. When the steamboat owners finally awoke to their danger, the railways were everywhere; their capitalization had reached a figure which made them preponderant in the world of finance; shippers were unable to take the large view, and saw only the free passes and immediate rate concessions held out to them, blind to the coming time when the railway should, like Poe's Red Death on the morning after the feast, "hold illimitable dominion over all." This is the steamboat view.

The railway men, on the other hand, declares that the passing of the steamboat was but the inevitable progress of an outworn instrument of transportation to the evolutional scrap heap. The steamboat season was limited; the railway runs twelve months every year. The steamboat schedule is broken by high water, low water, floating ice, storm; the railway is well-nigh as independent of weather as of season. An upstream freight carrier nets five miles an hour; a slow freight train nets 15. Steamboats are confined to certain routes, nearly always circuitous; railways may follow air lines in level country, and surmount mountain ranges in that which is rough. Steamboats are restricted to waterside terminals in delivering freight; railway terminals may be as wide as the confines of the community served.

Each of these explanations wins its victory too easily; both are characterized by what John J. Ingalls called "the fatal gift of facility." Waterway explainer and railway explainer have shirked the laborious task of finding out why the steamboat passed away before the railway advance; each has told how the change ought to have occurred.

Now, history manufactured by "the rule of reason" is the least trustworthy commodity known to the commerce of ideas. Actual situations are always more complex than our thoughts about them. Leaving altogether at one side the question why the steamboat ought to have yielded to the railway, why, in fact, did it yield?

The moment we begin to scrutinize the two standardized explanations, we are afflicted with certain doubts. The steamboat man's explanation may apply to the final phases of the struggle, but it seems wholly insufficient to account for the railway's initial victories. When the railway first appeared upon the scene, it was the interloper, the untried ad unproven instrumentality, while the steamboat held the field. Throughout the river valleys of the West, the steamboat interests controlled transportation, and were inextricably interlocked with banking and manufacturing interests. As for total depravity, manifesting itself in rate-cutting and kindred practices, by what Machiavellian stroke did the infant railways possess themselves of all the effective resources of human rascality, and leave the steamboat owners to go to hopeless ruin with clean hands and pure hearts? No explanation of this miracle has ever been tendered, nor am I aware of anything in the history of morals which might help one to understand it.

When we turn to the railway explanation we feel the same dissatisfaction. It is true that the river carrier does not operate throughout the whole year; but the same disability has not prevented the lake carrier from building up a traffic which is one of the wonders of modern transportation. The railway may, within certain broad limits, go where it pleases and deliver goods where they are desired; but the infant railway competed for business in a world organized for steamboat traffic, with waterside warehouses and factories. Steamboats are much slower than fast freight trains; but in the years of the railway's initial victories over the steamboat our modern

high-pressure system of distribution had not been organized, and was not even dreamed of. Shoes were made by hand; packinghouse products were unknown outside of a few large centers; harness, wagons, buggies were made in small shops in every village; bananas and oranges were unfamiliar delicacies to the average American. We cannot account for the early triumphs of the railway by invoking its supply of needs which had not then been created.

When we consider the main contention of the railway view —that the steamboat was brushed aside before a more economical means of transportation—we are confronted by the incontestable fact that it has not been brushed aside. Small as is the volume of steamboat traffic, it still continues, and not simply with districts not readily accessible by rail, like the projecting tongue of land between the Mississippi and Illinois. The steamboat survives in highly competitive territory. St. Louis and Alton are connected by railways and by a fast interurban trolley line; yet packet boats, carrying both freight and passengers, carry on a trade which flourishes in the teeth of this double competition. The Lee line runs steamers between Memphis and St. Louis, Memphis and Vicksburg, and Memphis and Cincinnati, in competition with great railway systems operating through a country whose climate and topography are especially favorable for economical railway operation. The single instance of this company, with its record of continuous operation for more than a generation between chief commercial centers of the central west, is proof conclusive that the explanation of the passing of the steamboat must be sought in something more convincing than an easy generalization about "an outworn instrument of transportation."

The full explanation is not all to be found in any one place. The portions of it which I have gathered have been encountered in many places: in conversations with old merchants in little waterside towns, and with old pilots on hills overlooking long reaches of empty river; in stray remarks dropped in pilot-houses, as a laden packet went swinging down the long curve under the high bank of a great bend on a summer night; from dusty files or newspapers of the '50's; out of observation of the actual operation of steamboats on many waters at the present day. The main factors of the decline of the steamboat trade in the face of the railway advance were:

Instability of rates.

Uncertainty and irregularity of service other than those occasioned by the shortness and variable length of the river season and the ordinary hazards of navigation.

The short life of the individual steamboat.

The nuisance of marine insurance.

The lack of effective line organization.

The habit of extravagance engendered by an era in which the westward advance of population was out of all proportion to the capacity of existing means of transportation.

The first two points—instability of rates and irregularity of service other than that inseparable from the conditions of steamboat operation—are so intimately related that they may most conveniently be considered together.

In the golden days of steamboating there was not a stable rate in all the vast region lying between Fort Benton, Mont., and Pittsburgh, Pa. Each steamboat was an independent traffic unit; the captain was his own freight and passenger association, classification committee, and general passenger and freight agent. In New Orleans in the greatest year river trade ever saw—the season ending August 31, 1860—the average cargo of the 4,030 steamboats tieing up at the levee was 540 tons; at St. Louis, 18 years before, the average cargo of the 2,412 arrivals was 193 tons. It is not too much to say that there were as many "adjustments" of rates as there were arrivals, for while occasionally two or three boats might load side by side at identical rates, more often the captain of a steamboat that was loading found it either necessary to "shade" his figures to complete a cargo, or possibly to raise them as the available stowage space grew smaller, in view of an empty river and a full wharf.

A single instance will mirror the situation. Missouri City, on the north bank of the Missouri river, 28 miles below Kansas City, was once an important shipping point for a wide hinterland. "When boats were plenty at the season of high water," said an old shipping merchant, "the St. Louis rate would go down to 25 cents; when the low water season came on and boats were scarce, it sometimes reached $2.50. Passenger rates varied from $10 to $25 for the same reason."

An incident of those days rounds out the picture. "I remember," said the Old Timer, "once Jim Lane sold some tobacco to the government. The water was low, and Jim was mighty anxious to get it started towards Fort Leavenworth. Well, the *Annie Jacobs,* Captain Bill Massie, come along, loaded so's she was drawin' all the water they was in the river, but pretty well down by the head, so if she got her nose over a bar, the rest'd be pretty sure to follow. 'Take my tobacco?' says Jim. 'Not on yer life,' says Bill Massie. Jim begged and begged, but 'twa'n't no use. Finally he says: 'Cap,' says he, 'if you'll jest put that tobacco aboard, and start her up river, I'll pay ye the full rate, and give ye the best suit o' clothes that a $100 bill 'll buy in St. Louis,' so Bill he took the tobacco." It is needless to remind the reader either that the Elkins law slumbered in the bosom of the unrevealed future at this time, or that that interesting statute has never been construed to apply to steamboats.

Late in November, 1852, just at the end of the season, the *Excelsior* arrived in St. Paul from St. Louis with 300 tons of freight for which she had received "one dollar a hundred any distance."

Coupled with fluctuations in rates which mounted to 1,000 per cent. of the minimum there was great irregularity of service, owing to the fact that the individual steamboat did not, for the most part, develop a trade and stick to it, but went where the returns were greatest. The western "steamboat country" extended from St. Paul to the gulf, and from the heart of the Southern Appalachians and the headwaters of the Allegheny to the foothills of the Rockies in Montana. Times might be dull on the Tennessee and good on the Ouachita; the Minnesota river trade might boom just at the time when crops had failed on the Osage and the Gasconade. What happened then? A steamboat which had made regular trips to certain landings for two or three seasons might enter another trade simply by hiring a new pilot, or instructing the old one, if his license covered the new territory, to turn the boat's head in that direction. The freight at the old landings would wait in vain; it might rot, or find some other conveyance. Nothing bound the vagrant steamer to her old trade, as the sound of her deep breathing grew fainter in the distance, and the white water from her paddles blended indistinguishably with the turbid river. This tendency of the steamboat, without warning to the shipper, to deprive him of his accustomed means of transportation just at the season of his greatest need—the time of crop failure, or of slow transit, because of low water—was one of the prime uncertainties of business "when the steamboat was king." Trade can adjust itself to a limited shipping season; the hazards of high and low water follow, usually, a certain cycle, and may be in a general way foreseen. But the steamboat that departed for more crowded landings just at the time when an established trade most needed regular service introduced into business a hazard of the first order.

What was the effect of these fluctuations in rates and uncertainties of service on the competition of rail transit with the river trade?

While there are, of course, factors making for variability in rail rates, they are few and feeble compared with those which influenced river rates in the olden days. The river is an open highway; any man who could command $20,000 could build and pay for a small sternwheel boat and become a factor in rate making; the railway is an artificial traffic way and requires a

heavy initial investment before equipment is purchased and operations begin. The costs of river transportation as carried on in the '50's were only interest on cost of equipment, depreciation of equipment, wharfage charges, fuel and boat supplies, and wages of crew. To run a railway requires a large and permanent organization—engineers, section men, bridge men, station agents, despatchers and signal men, yard and roundhouse crews, a traffic staff, etc.—in addition to the crews operating the trains. All this fixed expense tended inevitably toward stability of rates. Then, too, the climatic factor, while affecting the railways to some extent, is negligible in rate making. Times of high water may cause an occasional washout on a railway, but that is all; while the season of low water does not exist for railway operation. A railway knows delay on account of storms, but it is but an incident of the day's work. In the steamboat trade, on the other hand, low water greatly increases operating expense, while high water makes certain landings inaccessible, and opens up some areas of traffic which are closed at ordinary stages. All these are real and vital factors in the making of rates.

Still another thing must be taken into consideration: the size of the unit of equipment. A railway train is elastic, and is an aggregation of traffic units containing, in the early days, about eight or ten tons each. The steamboat with which they competed had a fixed capacity averaging as much as two 20-car railway trains. Full or empty, the downstream expense was practically the same, and the upstream cost nearly so. After a boat had secured cargo enough to meet her fixed and operating expenses, all that came to her in addition, at any rate greater than the expense of setting it on and off, was so much clear gain. If the freight trains of that day had had a fixed length of 20 cars, railway rates would have had an additional element of instability.

But in the matter of service, the great advantage of the railway over the steamboat was that the grade was not portable and the rails spiked down. The railway stayed when the steamboat went —not because the railway man was wiser than the steamboat man, not because he would not have been glad to move his road, when times were dull at home, to lead into the Red River Valley, or to the mines of Montana, but simply because it couldn't get away. Before long, the railway man began to see his opportunity in the steamboat man's desertion of his territory. *The railway intrenched itself as an instrument of transportation in the lean years, when the steamboat had departed for other valleys, where the hills were green afar off.*

Now it is an axiom of the transportation business that any rate is better than an uncertain rate. When this is re-enforced by the further axiom that a certain means of transportation has an infinite advantage over an uncertain one, it will be understood why the shipper "signed up" with the station agent after the steamboat had left his goods, literally high and dry, in his hour of need, and paid a somewhat higher rate for a definite service. The shipper was willing to wait for the *Prairie Belle* when the river was low, and to lay in a stock in the fall to "run him through" till spring; but when the captain of the *Belle* left the Illinois river to go to the Yellowstone without sending him word, and he let the *Evening Star* go by because he was saving his apples for the other boat, thus losing a dollar a barrel in the St. Louis market, he vowed vengeance, and went in quest of the railway station agent.

The life of the wooden steamboat is short. The *Western Boatman* for 1848 presented an estimate of the total number of steamboat "fatalities" up to that time, with an analysis of causes. The conclusion was that the average age of boats "worn out or abandoned" was five years, and that of those "sunk, burnt or otherwise lost" was "four years, or nearly four." In the 10 years between 1840 and 1850 there were 270 boats lost in western waters. Forty boats lost their lives by snags in 1840, according to Gould's "History of River Navigation," and 29 in the year following. George B. Merrick, the historian of steamboating on the upper Mississippi, has compiled records, as far as possible, of every boat which ever ran regularly above the Upper (Rock Island) Rapids. Their average life was five years. The most prosperous year on the Lower River, 1860, saw 290 boats destroyed or damaged; 120 of these were totally destroyed.

It is interesting to compare these figures with the number of steamboat arrivals at New Orleans, the great entrepot of the valley. These totaled 4,030. The casualty list, of course, includes all Western waters, but it is suggestive that if the boats reaching New Orleans averaged but ten trips each in the season—which is 12 months long on the Lower River—the fleet numbered but 403; and that the number of casualties in the Valley resulting in total loss was about one-third as great as the whole New Orleans fleet.

The average life of the boats worn out in service seems very short. We shall return to that point later. It should be remembered here that average means average. There were boats which remained in service for 20 years, like the *Itasca*, built in 1857, and burnd at La Crosse in 1878; but there were others, which never completed the first trip.

Now, the short life of the steamboat had a very definite influence in its contest with the railway, entirely apart from the question of hazard. A railway is, physically, a resistant thing, and a dull season perhaps has as great a tendency to lengthen the life of rails and equipment as to shorten it. But the causes which operated to produce a dull year in the steamboat trade—crop failure and consequent paralysis of business—brought about also a stage of water that greatly increased the hazards of operating wooden boats. Then, too, it must be remembered that the prosperous boat owner who became a trifle lazy and stopped building boats, though he might continue to operate all he had, would, in the course of a very few years, go out of the business automatically. A railway, short of bankrupt sale, remains, for better or for worse, in the hands of its owners; a fleet of wooden steamboats, no matter how well operated, if not re-enforced by frequent additions, literally disappears from sight in the course of a few years and "leaves not a wrack behind."

The nuisance of marine insurance was a factor in the decline of the steamboat trade which may be summarily disposed of. For some inscrutable reason, steamboat men have never learned to deal with the insurance brokers themselves, and issue an insured bill of lading. After the shipper has obtained a satisfactory rate, he must visit the broker himself, and get his insurance. Nor is the insurance full; it covers only damage in transit; goods at the landing are at the shippers risk. Even though freight rate and insurance rate added together leave a comfortable margin below the rail rate, there are the human factors of worry and trouble, and the commercial factor of time lost over negotiations.

Before we begin to consider the effect on the steamboat trade of absence of adequate line organization, I wish to revert to the important fact that the victory over the steamboat was won, not by the railway of the present day, but by the railway as it was in the Mississippi valley between 1860 and 1880. When the steamboat man of the present day talks of the change that has come over his calling, he accounts for it by experiences of the past 25 years, the darkening twilight period since the setting of the steamboat sun. When the railway man of the present day pauses to account for railway supremacy, he unconsciously thinks in terms of the modern railway. Now, let us recognize, once for all, that the railway that won a victory over the steamboat knew nothing of continuous brakes on freight trains; that its freight cars carried from 16,000 to 28,000 lbs. each, instead of from 60,000 to 110,000; that 38 tons was, in the Mississippi valley, a heavy locomotive; that rails were largely of iron, perhaps 40 lbs. in weight on the average; that block signals, gravity terminals, automatic couplers, steel underframing and draft rig were as far from the vision of the railway man as were concrete bridges and culverts, 100-lb. rails, ½ per cent. grades through rough country, compound engines and superheated steam. The steamboat of fifty years ago was every bit as good as the steamboat of the present day; the record time between New Orleans and St. Louis was probably made by the *J. M. White* in 1844 (the

Robert E. Lee, in 1870, finished in less time than the *White*; but the river had materially shortened itself by cut-offs in the interval). The railway has gone on; the steamboat has stood still.

Is is very easy to draw the wrong inference from this fact. The hasty generalizer will jump to the conclusion that if the steamboat retired before railways so imperfect it is evidence of its utter worthlessness in the modern transportation world. Let me once more remind him of the boats now in operation in highly competitive territory, and advance, tentatively, the view that the conclusion to be drawn is rather that factors other than the straight economic test of two rival instruments of transportation are to be invoked in the explanation.

This is especially to be remembered when we take up the absence of adequate line organization, and its effect on the steamboat's fate.

The great magnitude of American commercial corporations, that most significant fact of our modern commercial life, with its marked effects on social organization and even on national character, is the direct result of necessities laid upon American railway managers by the continental sweep of American territory. The first big American corporation was the railway corporation and it became big because of the breadth of its necessary field of operation. In England, there is no town or village situated more than 90 miles from a seaport. In France, the greatest distance from the seaboard is little more than twice as much. In the United States, the goods which, at Buffalo, reach the eastern limit of lake navigation after a joruney of 1,000 miles are still 400 miles from the seaboard. In 1843, the traveler could go by rail from Buffalo to Albany, but he was carried on the rails of 16 different companies. The business was largely through business. It traversed a territory under one government, with one language, one law and one tradition. That these 16 companies, each but a link in one haul, should coalesce and become one was inevitable. It was but response to the compulsion of inexorable physical necessity.

All over the United States the same process was going on. The world had never seen such corporations. Mankind had never extended so far the bounds of a single commercial management. But the continent was inexorable. It was the continent that compelled the American railway manager to stretch his conceptions to its imperial extent, to think in terms of its vastness, to run one railway from the sea to the Lakes, and from the central river to the western sea. The early railway managers made mistakes. They tried to apply to corporations gigantic beyond precedent means of control inadequate to such vast creations. Some of them were devoured by their own Frankensteins. But the length of the railway was dictated by necessity. The road had to run to the land's end.

The steamboat man saw this, and tried to meet combination with combination. He failed. The reason is clear. He was not coerced by necessity. Between St. Louis and New Orleans one captain and crew, with a $40,000 boat, was as complete an instrument of transportation as the Illinois Central Railroad—of far less capacity, but equally sufficient unto itself.

The human factor is tremendously important here. The steamboat, in 1860, had been the chief means of transportation in the West for 40 years. It was then as old as the railway was in 1894, forty years after the first line touched the Mississippi. The best human material had gone into the business. Now, the steamboat man was an individualist, pure and simple. The captain made his own schedule, selected his own route, accepted or rejected freight consignments as his judgment dictated. He often owned his own boat; how often one must pore over old steamboat lists to realize. If he worked for other owners, they trusted him in everything, so long as the returns of the trade were satisfactory. He penetrated new countries. He braved hostile Indians. At each end of the season, in the North, his boat played a game with death as he dared the ice, for there were rich rewards for the last boat into St. Paul, and the first to leave St. Louis or Dunleigh (East Dubuque) in the spring.

One thing this admirable and capable individual did not understand—how to work in harness. This is the first lesson the railway teaches, for obvious reasons. It is, in the end, the great lesson of civilization's riper stages. The steamboat captain lived and died a pioneer. And when the transportation business reached the stage where organization on a large scale was a determining factor, the railway found itself with a personnel trained to pull together and move at the word of command, while the steamboat trade was manned by a splendid set of individual chieftains, undisciplinable, unorganizable, each ready to go down to the bottom of the river, if necessary, with his own particular pennant nailed to his own particular jackstaff.

The Rock Island tapped the Mississippi in 1854. Within two years thereafter railway reached the river crossings at Galena, Alton, Burlington, Quincy and Cairo, and the railway became a factor in the steamboat world. The first joint-stock company for the operation of steamboats in western waters was the "Cincinnati and Louisville Mail Line," organized in 1818. The first regularly organized company in the Upper Mississippi was formed in 1842. It was not until just after the Civil War that this form of organization was tried out on the Missouri. Many of the so-called "lines" were simply operating pools. Each captain owned his own boat, and could retire with his share of the profits or losses at any time. The instability of such an organization at just those times when organization was most vital to the life of the trade needs no comment.

A few brief biographies of lines, real and so-called, will reveal the actual course of events better than general statements. In 1858, the "Railroad Line," having traffic arrangements with the Illinois Central at Cairo, and the Ohio and Mississippi at St. Louis, was formed by the owners of 10 of the finest steamers in western waters to run between St. Louis and New Orleans. "While this was not a joint stock company, the boats were run in joint interest, and with a regularity heretofore unknown in this trade and at uniform prices for the business they did." The traffic man will read much between the lines of this naive comment of Captain Gould, vessel master and historian of steamboating. Soon the new line, which included the *Pennsylvania* and the *Alex. Scott*, was high in favor with shippers and passengers. "A position in the 'Railroad Line,' or a 'day in the line,' as it was called, was coveted by all who had a boat suitable for the trade, and commanded a large premium when offered for sale, and as high as $1,500 was paid in some instances." This line was broken up by the Civil War.

Just after the war, in the prostration following the destruction of southern trade and the disuse of army transports, a large joint stock company, the "Atlantic and Mississippi Steamship Company," was formed by steamboat owners, who took stock according to the appraised value of the boats they put into the line. The capital was $2,000,000. The line had through billing arrangements with railways and ocean-going lines. This venture was killed by the individualism of the steamboat man, both without the line and within it. The owners who were left out of the new organization combined at once and disorganized the rate situation by competition. The effects of this spirit within the line are eloquently summed up by Captain Gould. "Many of the steamboats were in commission, manned by crews with little [pecuniary] interest beyond their salaries, each crew striving to excel the other in the excellence and luxury of their tables and the speed of their boats, with no one to control or check their extravagance."

A lurid light is cast upon the central organization of a corporation the aggregate of whose property was "fabulous" to the chronicler. "The widespreading limits of the company's business rendered it impossible for the executive officers (only two of which were receiving salaries) to do more than give general supervision, leaving the detail and the result to the judgment and the caprice of those in charge of the boats." Discipline in the general sense there was none, and discipline on the individual boat appears to have gone by the board, for a series of disasters swept away half the fleet in six months. The line lasted less than

two years. We read that "the directors were liberal, high-toned business men, and stood manfully by the company throughout all its embarrassments."

It is worth while to remark again that these were the best boats, officered by the best boatmen in the valley. This single history is conclusive as to the fitness of the pioneer steamboatman to "work in harness."

All other forces making for the decline of the steamboat trade were intensified in destructive quality by the general social situation in the 40 years intervening between 1850 and 1890. This was a time when a tremendous population movement overflowed utterly inadequate channels of transportation. All the steamboatman's other disabilities might have been overcome had he been in any true sense a sane business man. He was the spoiled darling of fortune. The whole course of social development was such as to beget in him habits of extravagance, and to make him trust that the morrow would care for the things of itself. The steamboat, during the years between the building of the first railroad to the Mississippi and the completion of the Northern Pacific, which killed the trade between St. Louis and the Upper Missouri, was not, like the railways of the present day, the medium of the interchanges of a settled population. It was the vehicle of the advance of an eager population into a virgin land. The '40's and '50's saw the rush to Wisconsin and Minnesota; the period following the war witnessed the conquest of the Red river wheat country by immigrants by the Missouri, and the Red river of the north. Then came the discovery of El Dorados on the headwaters of the Missouri, beyond the end of its 2,084-mile steamboat journey from St. Louis.

"Many a time during the Minnesota rush," said an old pilot to me, "the captain has watched the people coming on the boat at Dunleith or Rock Island until she had all she'd sleep on the cabin floor and the boiler deck, besides two in every bunk and steerage passengers all over the freight on the main deck. When he guessed she had all she'd take, he and I would take the sounding pole and walk down the landing-stage, crowding back the people who were pouring on in a steady stream. Then we'd cast off and straighten up, with the levee as crowded, to the eye, as when we come in."

It was the demand for transportation thus created—and the incident given above could be paralleled many times in every "trade" of that day—that was at the root of all the steamboat's disabilities. It was responsible for the fantastic variations in rates; it was responsible for the desertion of established routes by captains, lured by the great rewards of pioneering. The short life of the steamboat would have lengthened, as improvements strengthened its weak places, substituted steel for wood, and differentiated passenger and freight carriers, just as has happened in Europe; but what was the use? When a good boat would pay for herself in one season and could reasonably be expected to last five, why worry over steel hulls and cargo-box barges? Suppose the shipper did find himself incommoded by the necessity of bargaining with the insurance broker; who cared, when there was more freight as it was than the boat could load? Suppose the line went to pieces; the captain of the *Nancy Belle* held a license covering the Missouri, and passengers were plenty at St. Louis with $300 each to pay for transportation to Fort Benton. Pilots were paid regularly $500 a month; crack men received much more. One pilot, paid by the trip, who had an especially good knowledge of the eccentricities of the Missouri, made $120 a day between Kansas City and Omaha. Captain "Bill" Massie "cleaned up" more than $30,000 in a single season on the Missouri at the wheel.

When the west and north became populated this transportation fever went down. It left the steamboatman with an empty pocketbook—for his prodigality had equaled his earning power—expensive tastes and invincible prejudices in favor of the business methods of a boom period.

The foregoing were, in my opinion, the chief causes of the decline of the river trade in the west. The causes usually alleged by critics of the railways certainly operated and go far to explain how the rail lines, grown strong and conscious of their strength, took away the remnant of the kingdom of the steamboat. But this is not the real problem; that is set for us by the earlier years, when the railway was crude and its service imperfect, when accidents were many and schedules represented only the substance of things hoped for, while the steamboat was the accepted means of transportation in a traffic world organized by and for water carriage. The victory of the railway was not a matter either of swiftness of transit or ton-mile costs. The question of the relative economy of the two instruments of transportation in the Mississippi Valley has yet to be tried out in a practical way.

MIKADO SUPERHEATER LOCOMOTIVES FOR THE MISSOURI PACIFIC.

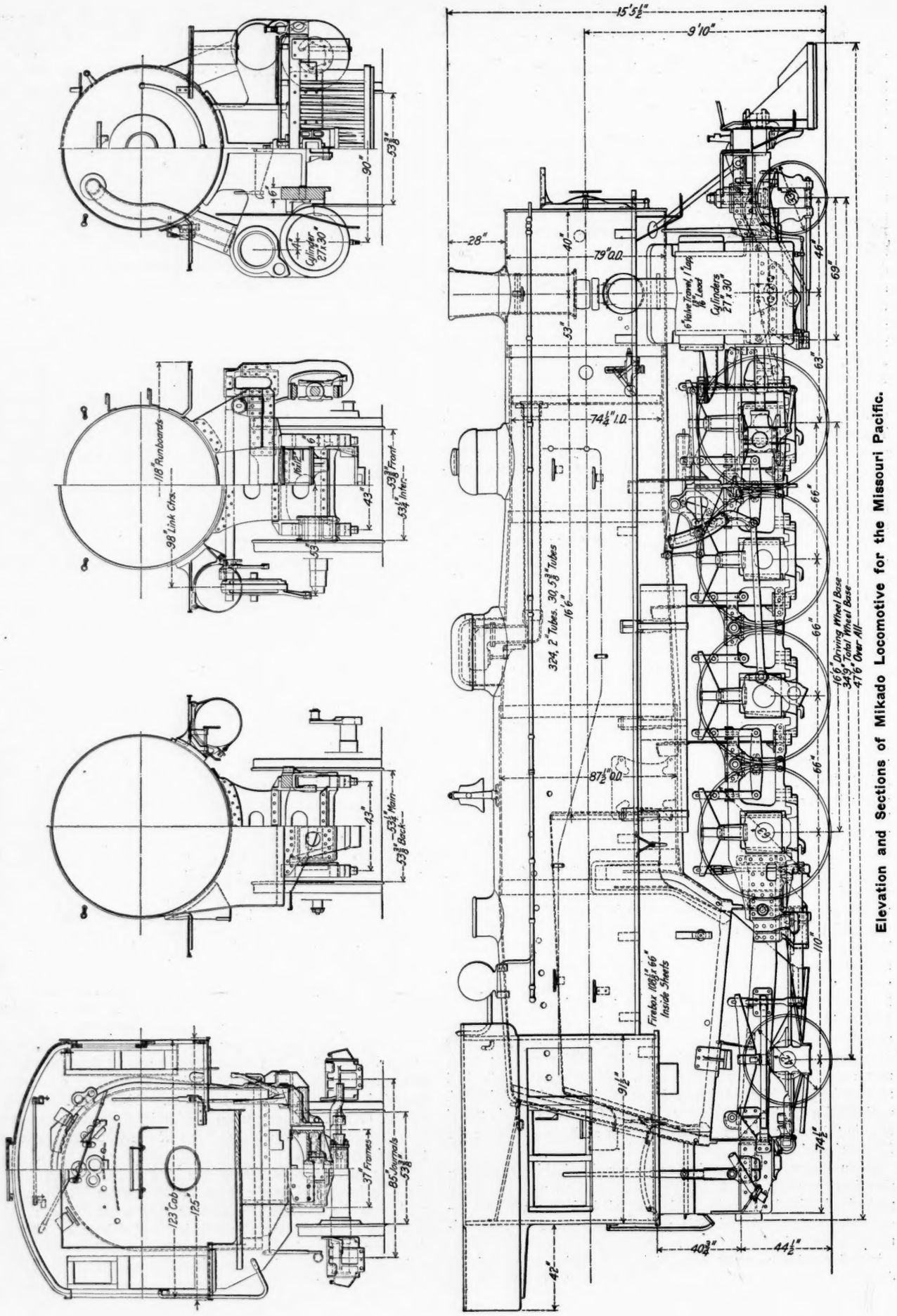
The Mikado type locomotive has become quite popular during the past year, the total number ordered being about 22 per cent. of all the locomotive orders placed. The American Locomotive Company, New York, has recently completed 50 locomotives of this type for the Missouri Pacific. These engines weigh 275,000 lbs. in working order, and are equipped with the Locomotive Superheater Company's type *A* superheater. The tractive effort is rated at 50,000 lbs., which with a weight of 209,000 lbs. on drivers, gives a factor of adhesion of 5.5.

The engines were built to replace the 103-ton consolidations, which have a tractive effort of 39,200 lbs., and are expected to haul about 28 per cent. more tonnage. They will be operated on the divisions between St. Louis, Mo., and Hoxie, Ark., and Kansas City, Kan., and Pueblo, Col. From St. Louis to Hoxie there are some heavy grades, especially between Des Arc, Mo., and Piedmont, where Gads Hill has a 1.6 per cent. grade on one side and a 1.4 per cent. grade on the other. Between Annapolis and Arcadia there is another severe maximum grade of 1.95 per cent. From Kansas City to Pueblo there is a general up grade, but the maximums do not exceed 1.5 per cent.

The boilers are of the conical connection type, the first ring being 74¼ in. inside diameter with a ¾-in. plate. The second course tapers to 85¾ in. outside diameter with a ⅞-in. plate. The dome is placed in this ring and is 10 ft. back of the front tube sheet. It is built up of 1¼-in. collar with a ½-in. shell, whose seam is welded, and a 1¼-in. dome ring. The firebox has a combustion chamber 34 in. deep, which limits the length of the tubes to 16 ft. 6 in. The grate is 66 in. wide and 108½ in. long, providing a grate area of 49.5 sq. ft. The total equivalent heating surface, which consists of the total heating surface plus 1½ times the superheating surface, is 3,795 sq. ft. The boiler pressure is 170 lbs.

The cylinders are 27 in. x 30 in., and are located on 90 in. centers, which brings them 23½ in. outside of the centers of the frames. The piston valves are 4 in. outside of the center lines of the cylinders and are connected to the steam headers by a pipe running directly through the side of the smokebox, which eliminates the passage through the cylinder saddle, making a comparatively simple cylinder casting. The valves are operated by the Walschaert valve gear and have a travel of 6 in. with a steam lap of 1 in. The exhaust ports are set line and line, and the valves are set with a lead of 3/16 in. The cylinders are provided with extended piston rods, which are supported by sliding crosshead bearings on guides in the extension casings. The frames are 6 in. wide, and are of the usual design for this type of locomotive.

These engines are similar to the Mikado locomotives built for the Illinois Central by the Baldwin Locomotive Works, and described in the *Railway Age Gazette*, September 29, page 585, in that they have the same size cylinders and drivers, and both use the same type of superheater. Their tractive efforts, total weights, weight on drivers and boiler pressures are very nearly alike, but the boilers are radically different, which makes a



Elevation and Sections of Mikado Locomotive for the Missouri Pacific.

marked difference in their ratios. The Illinois Central engines have boilers about 6 in. larger in nominal diameter than the Missouri Pacific, but do not have combustion chambers, which allows them to use tubes 4 ft. longer. Their total equivalent heating surface is also larger by 54 per cent. The accompanying table gives a good comparison of these two engines:

	Ill. Cent.	Mo. Pac.
Tractive effort	51,700 lbs.	50,000 lbs.
Total weight	283,850 lbs.	275,000 lbs.
Weight on drivers	218,000 lbs.	209,000 lbs.
Length of tubes	20 ft. 6 in.	16 ft. 6 in.
Boiler pressure	175 lbs.	170 lbs.
Boiler, nominal diameter	82 in.	75¾ in.
Firebox heating surface	235 sq. ft.	254 sq. ft.
Total heating surface	4,068 sq. ft.	2,868 sq. ft.
Superheating surface	1,093 sq. ft.	558 sq. ft.
Total equivalent heating surface	5,708 sq. ft.	3,705 sq. ft.
Grate area	70 sq. ft.	49.5 sq. ft.
Tractive effort × diameter of drivers ÷ total equivalent heating surface	570	850
Total equivalent heating surface ÷ grate area	81.8	74.8
Weight of drivers ÷ total equivalent heating surface	38.2	56.5
Total weight ÷ total equivalent heating surface	49.6	74.1
Total equivalent heating surface ÷ volume of cylinders	288	186.8

It will be seen that the tractive effort multiplied by the diameter of drivers, divided by the total equivalent heating surface, or the boiler capacity factor, is considerably larger in the Missouri Pacific locomotives than for those of the Illinois Central which would indicate that the former locomotives must run at a lower speed in order to meet the demands of their cylinders. The smaller grate area in the case of the Missouri Pacific engines would seem to indicate either that they would use a considerably better grade of fuel than used on the Illinois Central, or that the rate of combustion would be much higher.

The ratio of total weight to the total equivalent heating surface is about one-half again as much as that of the Illinois Central engines. Although the combustion chamber may tend to discount these differences, it is a question as to whether it will overbalance the whole difference. Following is a table of the principal ratios and dimensions of the Missouri Pacific locomotives:

General Data.

Type	2-8-2
Service	Freight
Fuel	Soft coal
Tractive effort	50,000 lbs.
Weight in working order	275,000 lbs.
Weight on drivers	209,500 lbs.
Weight of engine and tender in working order	431,100 lbs.
Wheel base, driving	16 ft. 6 in.
Wheel base, front truck	9 ft. 1 in.
Wheel base, total	34 ft. 9 in.
Wheel base, engine and tender	67 ft.

Ratios.

Total weight ÷ tractive effort	5.5
Weight on drivers ÷ tractive effort	4.19
Tractive effort × diam. drivers ÷ heating surface	1,100.
*Tractive effort × diam. drivers ÷ equivalent heating surface	850.
Total heating surface ÷ grate area	57.9
*Total equivalent heating surface ÷ grate area	74.8
Firebox heating surface ÷ total heating surface, per cent.	8.85
*Firebox heating surface ÷ total equivalent heating surface, per cent.	6.85
Weight on drivers ÷ total heating surface	73.1
*Weight on drivers ÷ total equivalent heating surface	56.5

Ratios.

Total weight ÷ total heating surface	95.9
*Total weight ÷ total equivalent heating surface	74.1
Volume of both cylinders, cu. ft.	19.86
Total heating surface ÷ vol. cylinders	144.5
*Total equivalent heating surface ÷ vol. cylinders	186.8
Grate area ÷ vol. cylinders	2.5

Cylinders.

Kind	Simple
Diameter	27 in.
Stroke	30 in.

Valves.

Kind	Piston
Travel	6 in.
Steam lap	1 in.
Lead	3/16 in.

Wheels.

Driving, diameter over tire	63 in.
Driving, thickness of tire	3½ in.
Driving journals, main, diam.	11 in. x 12 in.
Driving journals, others, diam.	10 in. x 12 in.
Engine truck, diameter	33½ in.
Engine truck journals	6½ in. x 12 in.
Trailing truck, diameter	42 in.
Trailing truck journals	8 in. x 14 in.

Boiler.

Style	Conical connection
Working pressure	170 lbs.
Outside diameter of first ring	75¾ in.
Firebox, width and length	66 in. x 108⅛ in.
Firebox plates, thickness	⅜ in.
Firebox water space	4½ in.
Tubes, number and diameter	224—2 in.; 30—5¾ in.
Tubes, length	16 ft. 6 in.
Heating surface, tubes	2,614 sq. ft.
Heating surface, firebox	254 sq. ft.
Heating surface, total	2,868 sq. ft.
Heating surface, superheating	558 sq. ft.
*Heating surface, total equivalent	3,705 sq. ft.
Grate area	49.5 sq. ft.
Center of boiler above rail	9 ft. 10 in.
Top of smokestack above rail	15 ft. 5½ in.

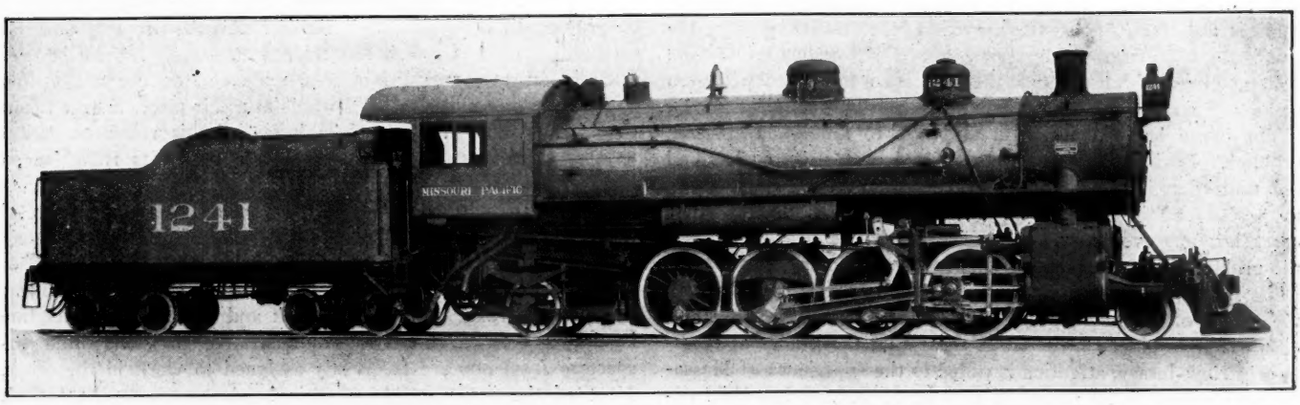
Tender.

Tank, style	Hopper
Frame	Cast steel
Wheels, diameter	33 in.
Journals	5½ in. x 10 in.
Water capacity	8,000 gal.
Coal capacity	14 tons

*Total equivalent heating surface equals total heating surface (2,868 sq. ft.) plus 1½ times superheating surface.

ANNUAL REPORT OF NEW JERSEY COMMISSION.

The Board of Public Utility Commissioners of New Jersey, Robert Williams, Thomas J. Hillery and W. M. Daniels, have issued their annual report—a comprehensive and business-like document. This is the first important report made, the report of a year ago having been made before the reorganized commission had been in office long enough to begin important activities. The railway commission, which was succeeded by the present board, was established only five years ago. The present board has broad powers; it may fix just and reasonable rates; may suspend increases in rates; and, in general, has authority over railways, telephones and lighting companies, like the New York commissions. The three important problems now before the board are the rates for intrastate commutation passengers, the price of gas and the charges for the use of telephones. Season ticket passengers going to Hoboken and Jersey City have to buy tick-



Mikado Superheater Locomotive for the Missouri Pacific.

ets to New York (including ferryboat fare) and pay the New York rate. The question of requiring a reduction was before the commission for some months, and an order was finally issued requiring season tickets to be sold to Hoboken and Jersey City. The railways complied with this order, but named rates the same as those to New York, and the question of the authority of the commission is now before the supreme court of the state. The commission has forbidden numerous proposed increases in passenger rates.

Cases of discrimination by street railways have been before the board, and a number of decisions have been rendered. The charges for gas and for electric service are briefly discussed. An elaborate investigation is now being made of telephone rates. The board has fixed a code of standards and regulations for the gas companies. The commission proposes to require the telephone companies to file their tariffs and also to conform to a system of uniform accounts, such as the Interstate Commerce Commission has prescribed for railways. Many telephone companies do such a small business, however, that they cannot reasonably be required to keep elaborate accounts. The street railway companies now keep their accounts in such a way as to conform to the system prescribed by the Interstate Commerce Commission, and they will henceforth be required to file reports.

Much of the time of the chief inspector and of the counsel of the board has been taken up in the examination of franchises, the law now requiring that every franchise for a public utility shall be approved by the board. The board also is charged with the duty of approving issues of stock, bonds, etc., and the report calls attention to the fact that under a law passed in 1906 bonds may be issued for 25 per cent. more than the value received; and it is suggested that this law ought to be repealed and the board given exclusive authority to settle all questions connected with the approval of issues of securities.

The board has made no changes in the requirements as to railway accidents, but now requires reports of accidents from street railways. Accident reports have not been required from other public utilities, because the board has had to keep a great variety of records, taking up its time and facilities; but inspectors of the board report anything dangerous that they may see. Officers of public utilities cheerfully co-operate with the board in abolishing dangerous conditions. The report mentions the investigation which the board made on the derailment at Martin's Creek, and says that the Interstate Commerce Commission concurred in the report of the New Jersey board on that accident.

Systematic inspections of railways are made, the same as was done by the old commission; and also of street railways and other properties, so far as practicable. The Interstate Commerce Commission is to send to the New Jersey commission duplicates of the reports which it receives concerning the inspection of locomotive boilers. The board is required by a law of May, 1911, to formulate regulations for the safe transportation of explosives, but thus far it has delayed action because changes are going on; in the meantime, the requirements of the Interstate Commerce Commission afford reasonable protection.

Complying with an order of the legislature the board will soon make a report on the proposition for a full crew law.

The board has given careful attention to the grade crossing problem. During the year it has secured protection, or has had the protection improved, at 49 grade crossings. It has refused to permit certain new highways to cross tracks, and in other cases has approved new grade crossings. The board discusses the problem of grade crossing elimination in a conservative tone, while yet expressing full appreciation of its gravity, as related to the safety of the public. To indicate in some degree the great cost which would be involved in separating the grades at crossings in New Jersey, attention is called to the experience of Massachusetts, where in 20 years the sum of $34,372,048 has been expended; 21 millions by railways, nearly 9 millions by the state, and about 4½ millions by the cities and towns. The board suggests to the legislature that any law on this subject should provide for an equitable division of the cost between the railways, the state and the municipalities. Continuing, the report says:

"So far as the elimination of a grade crossing lessens damage costs, and the cost of protecting the crossings, it redounds directly to the financial benefit of the railway. So far as it permits greater speed and facility of operation it also helps railway earnings. But the carriers must make a capital outlay on this elimination work; and so far as the annual charges on the outlay are not met by the economies and facilities provided by track elevation, the roads are bound to obtain the residue of the increased annual charge from rates and fares. If the public owned and operated the roads, track elevation would necessarily be a public charge in its entirety. While it is argued that private ownership and operation for gain transfers the responsibility from the public to the carrier, the interests of both are so closely related that in the final analysis, no matter what provision is made for its immediate assumption, a part of the charge must be borne by the public.

"If a law is passed which provides that grade crossings shall be eliminated without cost to the municipalities, it is not unreasonable to assume that, no public burden being apparent, an agitation will start for the elimination of grade crossings wherever they exist, for all grade crossings are objectionable and possess some element of danger.

"But to remove all these crossings must be necessarily the work of years; disappointment would ensue to those who had been led to look for immediate results, and doubt would arise as to the efficacy of the law, no matter how earnest and intelligent the efforts made for its application.

"If, on the other hand, the law provides that a part of the cost, which may be small, in proportion to that paid by the railway, shall be borne directly by the municipality, sharing the benefit, local movements for the abolition of grade crossings would be accompanied by a sense of direct financial responsibility, which would tend to concentrate public attention on efforts for the elimination of crossings where the danger and annoyance are greatest.

"It would seem that this concentration of attention would lead to more practical results than could be reasonably looked for if the efforts for crossing elimination are based upon the general public impression that all grade crossings in the state are to be eliminated without cost to any municipality in which such crossings exist. Any law providing for a division of the cost of eliminating grade crossings should be so framed that the municipalities would be protected against any extravagant or disproportionate expenditure of public funds for this purpose."

The board recommends the amendment of the public utilities laws as follows: Where a company sells bonds for less than their face value it shall be required to amortize the discount, the board to decide at what rate. The board should have power to order connections not only between railways and street railways but between telephones lines. New public utilities should be granted an indeterminate franchise. All the property and the intangible rights (except franchise valuations) should be defined in advance and a fair return allowed on the value thus fixed; the property to be purchasable at a fair price, if ever taken over by the city or state. The intent of this recommendation appears to be that a public utility shall retain its franchise so long as it conforms to the law.

The report ends with a chapter describing the organization of the commission. It is divided into two divisions, the railway division and the utilities division. Each has a chief and three assistant inspectors. An accountant of the board examines applications for approval of issues of stock and bonds. No strict line is drawn between the two administrative divisions; and inspectors from one are frequently assigned to work in the other. Most of the inspectors have their headquarters at the branch office of the commission in Newark. The board has insufficient room in the State House at Trenton.

IMPROVED METHOD OF TREATING TIES AND TIMBERS.

BY W. F. GOLTRA.

The science of timber preservation is one of the liveliest subjects before railway men today. Many problems in the art of treating wood with antiseptics have yet to be solved, and there is much room for improvement. Undoubtedly much improvement over methods commonly employed in this country, is possible in the securing of a speedier and more efficient method of seasoning, a better preparation for impregnating ties and timbers, as well as greater economy in handling of material. Despite the diversity of practice it is possible to find among the experienced and practical operators, both in this country and abroad, a measure of agreement as to both methods and results, and from these to outline the essentials of a correct method.

A new and original method of treating ties and timbers with preservatives is here submitted for the consideration of those interested in timber preservation. Several distinct steps are taken in carrying out this method or process, consisting of steaming of ties upon delivery at plant; stacking of ties in the yard for open air seasoning; machining of ties preparatory to impregnation; completion of drying and warming ties in ovens, and impregnation with antiseptic liquid.

A suitable plant for making this process effective is illustrated in the accompanying drawings.

STEAMING TIES.

Upon arrival of the ties or timber at the treating plant, they are transferred by hand from standard gage cars to narrow gage tram cars, which are placed alongside. The tram cars are then run into the steaming cylinder. The ties or timbers are subjected to live steam for a period varying from 30 minutes to four hours, depending upon their character and condition, at a pressure of about 15 lbs. per sq. in. In most cases possibly 15 to 20 lbs. should be the maximum, for reasons set forth later. It should not, however, be inferred from the above that it is necessary to separate ties or timbers into groups for steaming beyond the natural separation at the shipping point.

In order that this step in the process may be clearly apprehended, both as to its own importance and its preparatory value for what is to follow, it will be observed that steaming the wood as above indicated has the effect,

1. Of breaking the cell walls and producing narrow microscopical slits, through which the juices and saps in the cells and intercellular spaces are liberated.

2. Steaming effects a great reduction of the time subsequently required for seasoning the wood, whether it be in a dry kiln with heated air, or by natural air seasoning. This greatly reduces the stock necessary to maintain on hand and thus reduces about three-quarters of the capital that might otherwise be tied up, when the ties or timbers are not steamed. It further effects a material economy in the cost of installation of a treating plant, by proportionately diminishing the storage yard space and length of tracks needed to handle the ties. Fire insurance and taxes are also correspondingly reduced.

3. Steaming dissolves and withdraws the juices and saps contained in the wood and prevents decay when subsequently dried. When green ties, and lumber generally, are piled for air drying without preliminary steaming, the saps and juices ferment and decompose rapidly. Decay attacks the delicate cells and less compact portions of the timber, and then the firmer portions until, in a few months, the timber becomes spongy or doaty in the interior and its strength is impaired. In this condition it absorbs undue quantities of preservatives, when afterwards treated.

4. Steaming softens the outer surfaces and opens the pores of such timbers as may have had a preliminary air seasoning and which may have become "case-hardened," thus permitting rapid evaporation of the moisture contained in the interior of the timber and thereby preventing much of the checking and splitting, which is so common in crossties and timbers generally, while undergoing air seasoning.

5. The chief point in securing good treatment is to withdraw the juices, saps and acids from the timber. Hence steaming is an essential part in the process of treatment of wood, not only as to the effect on the timber, extracting the juices and toughening the fiber of the wood, but in a general way to prepare it to absorb the chemical preservative, whatever it may be.

6. Experiments under varying conditions indicate that large timbers, such as railway ties, piling, etc., may be steamed at 20 lbs. pressure for as much as four hours without material depreciation of strength.

The duration of the steaming is determined by the color of the condensation from the cylinders. At first the condensed water runs off fairly clear and colorless, but later on it gets much darker and discolored and has a particular woody smell from the extracts dissolved. Steaming is continued until this stage is passed and the condensed water again runs clear and colorless, showing that the sap has been dissolved and withdrawn to the fullest extent possible.

The moisture in timber amounts to from 16 to 65 per cent. It is unequally distributed in green timber, being greatest in the sapwood. The per cent. of moisture present in different kinds of wood is approximately as shown in the accompanying table:

	Sapwood or outer part.	Heartwood or interior.
Pine, cedar, spruce, firs	45-65	16-25
Cypress, extremely variable	50-65	18-60
Oak, beech, ash, maple, elm, hickory, chestnut, walnut and sycamore	40-50	30-40

The lighter kinds of woods have the most water in the sapwood, thus sycamore has more than hickory.

It is manifest that the greater part of this moisture must be removed in order to put the timber in condition to receive treatment with antiseptics. While it is true that by long continued exposure to open air, timber can be sufficiently dried to meet common requirements, it is being seriously questioned if such methods do not require too much time and space to meet modern conditions.

When steaming sawed ties, or lumber, the pieces should be piled on cross sticks, about 1 in. apart horizontally, so that the steam will have access to all surfaces. The steam pressure should be only a few pounds at the beginning and gradually increased to not exceeding 20 lbs. at the end of the operation, so as not to heat the timber too suddenly, which might cause checking and splitting, an effect which frequently occurs when hot oil is introduced in the retort on cold ties.

Experience has demonstrated that it is not feasible to impregnate timbers with antiseptics immediately following the steaming, because the cells are filled with vapor and condensed steam, which resist the entrance of the chemical. A fair penetration can be obtained with zinc chloride, but scarcely any at all with creosote oil. It is very essential that the ties and timbers be dried after the steaming.

STACKING OF TIES IN YARD FOR AIR SEASONING.

Having taken the initial step in the seasoning process by steaming, the next in order is to evaporate the condensed steam or moisture from the ties or timbers. This is accomplished by stacking in a yard for air seasoning.

The loaded tram cars are drawn out of the steaming cylinders by a small locomotive or any other suitable means and placed on a transfer table. The table is moved to one of the parallel yard tracks and the tram-cars are drawn to the place where the ties are to be stacked. The tracks in the yard are laid with three rails so that a standard gage locomotive crane can stand on one track and unload narrow gage tram cars standing on another.

The use of a locomotive crane and transfer table also materially reduces the cost of building a plant, as the arrangement of the yard, thereby made possible, affords a better utilization of the space for stacking ties, lessens the space required and correspondingly lessens the lengths of tracks; and also obviates the expense of constructing a high-loading platform, as the treated ties are transferred directly from tram cars to standard

gage gondola cars, from the yard level, for shipment to destination. The space required for a plant having the capacity for treating upwards of one million ties annually is about 20 acres, and the length of the tracks in the yard is approximately four miles.

Ties which have been given a preliminary steaming dry rapidly, and the average time required to evaporate the moisture to put them in condition for treatment is about three months, depending upon the character of the wood and climatic conditions. Ordinarily it requires from nine to twelve months in the open air for ties to season sufficiently for treatment.

MACHINING TIES.

When the ties have sufficiently seasoned and are ready for treatment, they are taken from stacks, passed through an adzing and boring machine and loaded directly on tram cars to be transported to the ovens for the completion of the drying, and thence to the impregnating cylinder for treatment with preservatives.

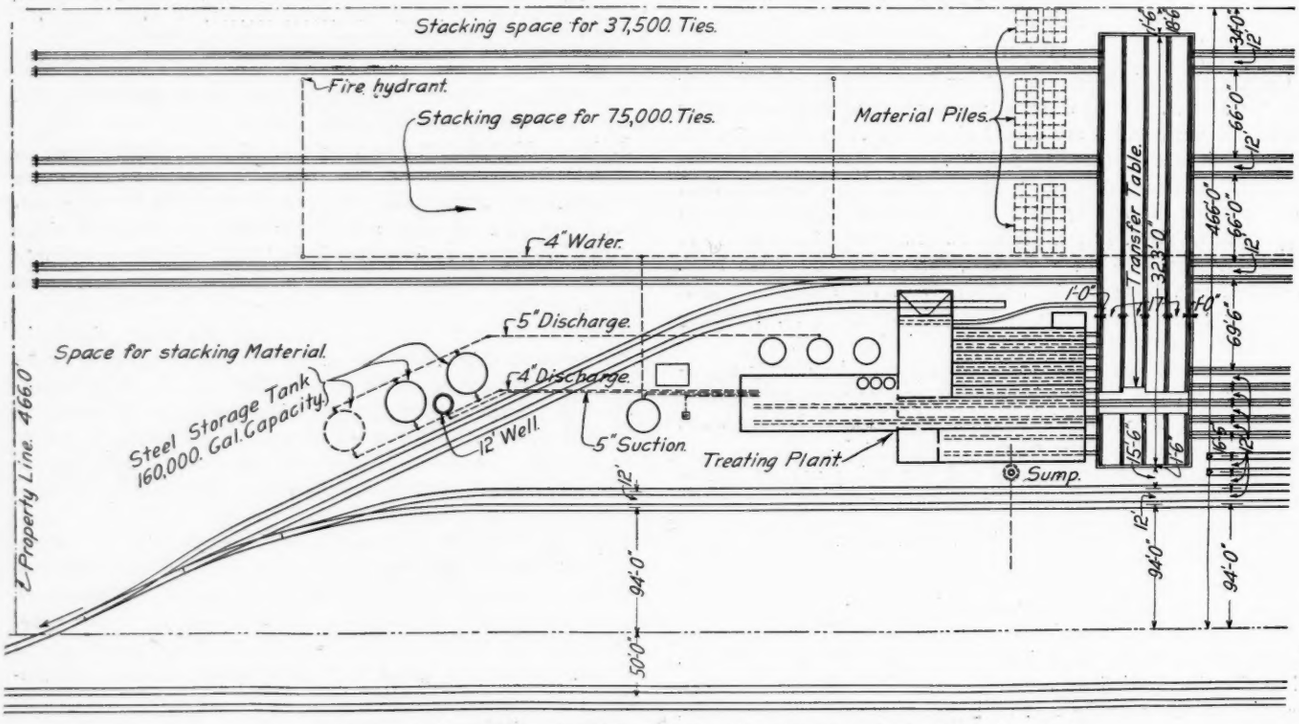
The adzing and boring machine is preferably mounted in a standard gage box car, which is moved about the yard and placed opposite the stacks of ties. A skid is placed between the stacks and the car on one side, and another skid is placed between the machine car and tram cars on the other side. In loading ties on tram cars care should be exercised to pile them loosely, both vertically and horizontally, to permit the heated air in the ovens, as well as the preservative fluid in the retorts, to come in contact with all surfaces. If the ties are sawed the parting strips should be about 1 in. thick to keep the surface apart.

There are two causes of tie deterioration, decay and mechanical wear, and there is no economy in increasing the resistance to one without also increasing the resistance to the other. Of these two destructive agencies decay is much the greater, but it is so interwoven with mechanical wear that the two should be considered together. It has been almost the universal practice on English, French and several European railways, to machine their ties before attaching the rails or rail chairs to them. The consensus of opinion in Europe is to the effect that such preparation, by machining, is of marked economy. Years of observations and tests on both treated and untreated ties, have proved that longer life is obtained by the machining operation. The machining of ties obviates the necessity of adzing them before laying in the track, thereby effecting a saving in the time and labor of the section men.

In fastening a rail to a tie, either a cut spike must be driven, or a screw spike must be turned into the tie structure. If a screw spike be used in any form now on the market, it is necessary to first bore a hole for it to enter. If a cut spike be used it is possible to drive it in most of our American tie woods without previously boring a hole. The holding power of a heavy spike is greater when it follows a small hole than when driven directly into the wood structure, also the boring of ties to be treated is essential because the holes become mediums through which chemicals reach the interior of the ties and it penetrates radially from each hole, thus promoting impregnation. In consequence, the spike never opens the grain of the wood beyond the penetration depth.

COMPLETION OF DRYING AND WARMING OF THE TIES IN OVENS.

After the ties have been machined and loaded directly upon tram cars, they are transported to the drying ovens.



Proposed Arrangement of Timber Treating Plant and Tracks.

The moisture content in timber has a very appreciable effect upon the way in which it lends itself to treatment, and any method that will make same moisture condition uniform is bound to result in a much more uniform penetration and dissemination of the antiseptic. Slow air seasoning is not found sufficient to insure a good preparation of the ties and timbers for treatment, and the drying should therefore be completed in the ovens. In France some of the treating plants are equipped with drying ovens and the seasoning of ties is completed just prior to the treatment with antiseptic.

Different woods absorb heat with different degrees of rapidity, depending principally upon the conductivity of their fibers. It has been demonstrated that an average of 24 hours is sufficient time to thoroughly heat timbers, such as railway ties, and during this time the moisture content will be reduced 3 to 4 per cent. The object in placing the timber in the ovens is not only to complete the air drying, but also to permit a perfect regularity of operations at the plant at all seasons of the year and

in all kinds of weather. The timber thus dried comes to the impregnating retort in a hot condition and the high temperature of the impregnating fluid, when introduced into the retort, is maintained when it comes in contact with the wood, consequently the penetration is deeper and more perfect. During the winter season, especially in the northern latitudes, it is frequently necessary to close down the works on account of ties being covered with ice and snow. When such ties are placed in the retort for treatment the warm impregnating fluid is congealed and, in consequence, the penetration is very slight. Again, ties exposed to the weather immediately prior to treatment are often drenched by heavy rains and absorb considerable water. This offsets, in a great measure, the air seasoning and makes it difficult to obtain good results from such seasoning alone.

The rapidity with which the drying can be carried on, after the material has received a preliminary steaming, or air seasoning, depends upon several factors, such as species of wood, its softness and porosity, proportion of heartwood and sapwood, intended use, and the manner in which it is presented to the air in the ovens. No positive rule can, therefore, be given as to the duration of the drying period and the temperature for the various kinds of woods, under all conditions, but experience soon teaches the operator how rapidly the ties or lumber can be dried in the ovens, without injuring, by splitting, checking, warping or honeycombing.

The drying oven, as a structure, is preferably built of cement and masonry and corresponds in length and size to the length of the impregnating retorts. The air is heated by means of heating coils, placed under or in the bottom of the ovens, and the circulation of the air is effected by means of a blower or fan. Fresh air enters at the ends of the ovens, passes through the heating coils, thence in the oven chambers, through the loads on the trams, to the opposite end of the ovens, and downward into the moist air duct, from which it passes into the moist air gallery and is drawn out by means of the blower. Each oven is adapted to be operated independently of the other, so that when one or more ovens are being charged, the others are not affected.

IMPREGNATING WITH ANTISEPTIC CHEMICALS.

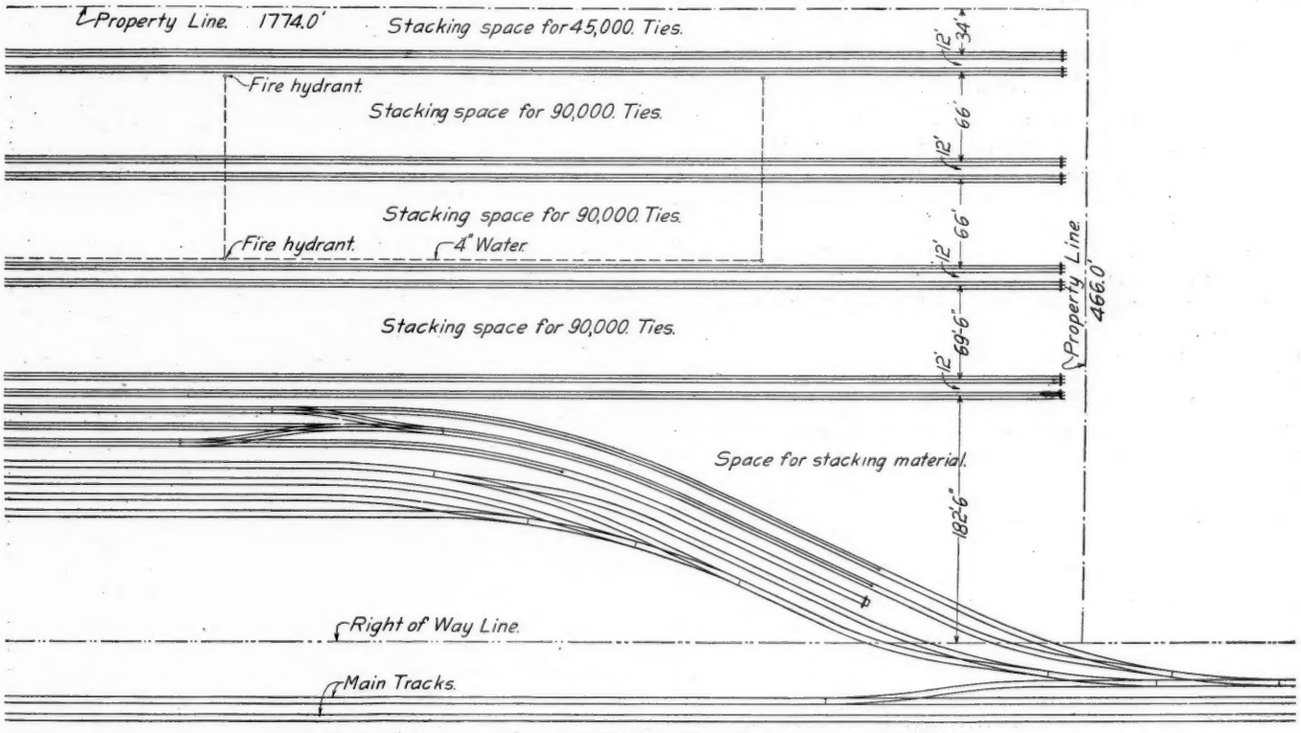
After the timbers have remained in the ovens a sufficient length of time to thoroughly dry and warm them, the trams are drawn out on to the transfer table and immediately run into the impregnating cylinders for chemical treatment. Each cylinder holds 12 trams, each of which carries between 45 and 50 ties, or approximatetly 560 ties per charge.

The duration of one complete operation in the impregnating cylinder is as follows:

Charging the cylinder with ties	15	minutes
Producing vacuum to 14 in.	45	"
Filling cylinder with chemical	15	"
Continuation of filling with pressure pump	90	"
Returning surplus chemical to working tank	15	"
Producing vacuum to hasten drying of ties	30	"
Blowing back last remnant of chemical to working tank	15	"
Opening door and discharging cylinder	15	"

Total, 240 minutes, or four hours.

In their order the first step is to produce a vacuum up to 14 in. of mercury and which should be attained within 30 to 45 minutes. The vacuum having been on for sufficient time it is held while the chemical is allowed to flow in, until the impregnating cylinder is completely filled, it being understood that the chemical, whether it be creosote, chloride of zinc, or a mixture of the two, has been previously heated by means of coils in the respective tanks to a temperature of 75 degs. F. When the air pressure in the impregnating retort reaches the atmospheric pressure, as shown by the vacuum gage, an air valve with an overflow pipe attached is opened to let the air escape from the retort, while filling. As soon as the fluid begins to flow in a full stream through the overflow pipe, the air valve is closed, and the force or pressure pump is put into action and kept working until a pressure of say 100 lbs. per sq. in. is obtained. The more the chemical penetrates the wood, the more the force pump has to be kept at work to maintain this necessary pressure, and the impregnation is considered complete when the manometer shows, for at least 20 minutes, that without further pumping the pressure has remained stationary at 100 lbs., thus showing that the chemical is no longer penetrating into the wood.



Proposed Arrangement of Timber Treating Plant and Tracks.

The duration of this phase of the operation varies from one to two hours, depending upon many factors, such as species of wood, its physical structure, proportion of heartwood and sapwood, degree of seasoning, size, shape, mass and other conditions, not a single one of which is sufficiently well defined to make it possible or practicable to segregate timbers into many groups for treatment. The treatment should, in all cases, be carried to "re-

fusal," which obviates the necessity for sorting ties or timbers into numerous groups.

When the timber has absorbed all of the chemical it can receive, the pressure pump is stopped and the solution valve opened. At the same time the air compressor pump which is connected with the dome on top of the impregnating cylinder, is put into action, pumping air into the cylinder and forcing the excess chemical back to the working tank from which it was originally drawn, through the solution pipes. The solution valves are then closed and a vacuum is immediately created in the cylinder by means of a vacuum pump. This vacuum, which need not exceed 14 in., is held about 30 minutes, or sufficient time to allow the ties to drip.

When ties or timbers attain a sufficient degree of dryness so that they can be handled comfortably, the vacuum is released and the dripping returned to the working tank. The tram loads are then drawn out and placed on a track in the yard, where they are transferred to standard gage gondola cars, by a locomotive crane, for shipment to destination.

YARD ARRANGEMENT.

A special feature of the plant, as shown in the drawings accompanying this article, is the entire absence of switches for running trams from one part of the yard to the other, and shifting of devices from track to track. Frequently the room or space, where a plant of this kind must be located, is limited and precludes the possibility of building a plant of the ordinary kind, with switches. Here a yard has been planned in which all of the tracks are parallel and relatively near to each other, and which are crossed by a transfer table, adapted to move back and forth and serve all tracks abutting thereon. The space required for a plant of this kind is about one-third less than required for the ordinary type. The length of the tracks is proportionately reduced. The plant is more compact and considerable saving in time and labor can be effected on that account. The maintenance and depreciation of tracks is materially reduced, and finally the entire cost of the plant entirely equipped is actually less than that of the plant of the ordinary type, of equal capacity.

APPROXIMATE COST OF PLANT.

The cost of the plant as described, completely equipped, exclusive of land, would be approximately as follows:

FOR PLANT.

Four miles of track and grading	$20,000
Six drying ovens with heating and ventilating apparatus and iron work, complete	16,000
Two steaming cylinders, saddles, piping, etc., installed	8,000
Two impregnating retorts, saddles, pipe connections, heating coils, etc., installed	12,000
Three 150 h. p. boilers set, complete	4,200
Iron, steel and wooden tanks, complete	10,400
Transfer table, electric motor, etc., installed complete	5,500
Brick buildings, including machine shop	18,000
Sewers	1,500
Pumps, air compressors, vacuum, pressure, general service, etc	4,600
Piping, solution pipes, steam pipes, air pipes, valves, etc., installed complete in retort building	5,800
Fire hydrants and piping complete	2,500
Electric plant and generator, wiring, etc., complete	3,000
Scales, creosote and zinc chloride wells, driven wells, and miscellaneous items	4,000
	$115,500

FOR EQUIPMENT.

One 12-ton locomotive crane	$4,500
One switch engine, 10 in. x 16 in. cylinders	3,000
200 tram buggies	9,000
Adzing and boring machine, mounted on 40 ft. steel underframe car, exhaust fan, air compressor, complete	10,000
	$26,500

RECAPITULATION.

For plant	$115,500
For equipment	26,500
Total	$142,000

In addition to the above, it is necessary to carry a stock of creosote oil and zinc chloride, which would perhaps amount to $30,000 on the average the year round. The above plant can easily treat 1,500,000 ties annually, with reasonable allowance for breakdowns and interruptions, provided it is operated night and day. In the event the capacity was increased 1,000,000 or more, it would probably be necessary to add two units of five ovens each to the plant, which would cost approximately $25,000. It will be observed that such a plant requires only about 20 acres of land and the tracks amount to only four miles. Furthermore, there is no need of a loading platform, as the ties are transferred from tram cars to gondola cars with a crane, from the ground level. This saves approximately $3,000 in the installation of a plant.

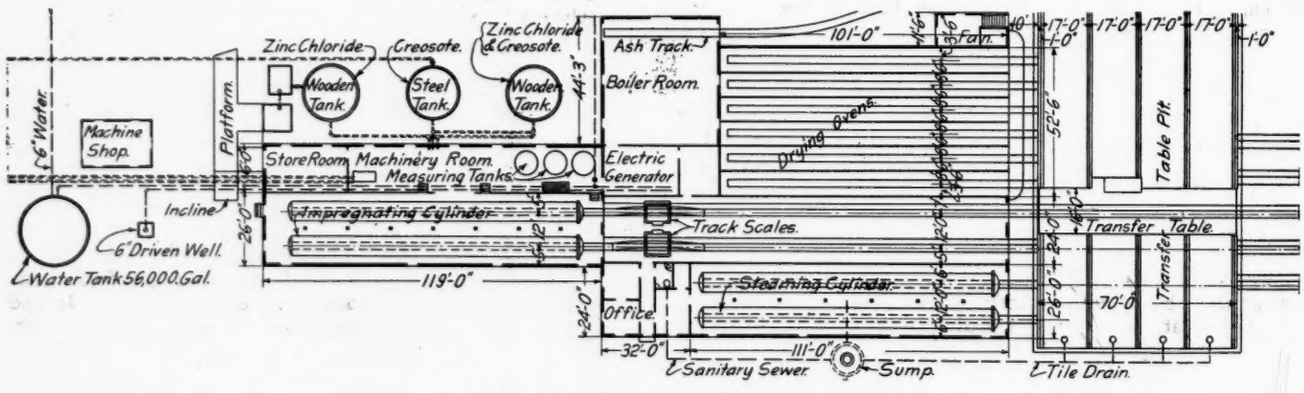
FOREIGN RAILWAY NOTES.

The president of Venezuela has approved the contract made by the department of public works with the representative of the Bolivar Railway Company on November 16, 1910, permitting the latter to import, free of duty, materials and tools absolutely necessary for the conservation and operation of the section of this railway between Tucacas and Aroa, to the extent of $193,000.

The president of Peru has approved the law passed by the Peruvian congress relating to the construction of railway branches from Trujillo to the mining camps at Salpo and Quiruvilca. This line is of especial importance, as it will open up for rapid development a large area of rich coal deposits. The branch line of the Oroyo-Tarma Railroad to Puerto Wertheman has also been approved.

The electrification of the railways of New Zealand in certain sections is now under contemplation by the government, especially where there are long tunnels, such as the one between Christchurch and Lyttelton, now the longest in the dominion, 1¼ miles long, and at the Otira tunnel and at the Rimutaka incline, between Wellington and Napier in the North island, where there is a grade averaging 1 ft. in every 3 ft., requiring two or three engines for hauling trains up the incline.

Except several very short railway lines owned by mining companies, all New Zealand railways are owned by the government, hence there is no competition such as applies to American railway systems, and there is not the incentive to rapidly branch out into new territory to get business as there is among railways in the United States, which have been obliged to show enterprise in order to get ahead of rivals. In New Zealand no competition would be permitted with existing government lines, which must, however, face considerable competition with coastwise boats.



Arrangement of Treating Plant.

General News Section.

The Boston & Maine is introducing motor cars for the use of track repairers.

The Prime Minister of Manitoba announces that a public service commission will be established in that province to supervise and regulate railways, gas works, electric lighting, telegraphs, etc.

The fast mail train of the Lake Shore & Michigan Southern on January 2 was run from Cleveland to Toledo, 108 miles, in 105 minutes, making up 40 minutes. The train consisted of 12 cars and was drawn by two engines.

The New York, New Haven & Hartford announces that henceforth free individual paper drinking cups will be provided on its trains for passengers. The use of a common cup for passengers is now forbidden by law in both Massachusetts and Connecticut.

The usual annual offer of the United States Steel Corporation to its employees of the privilege of subscribing to its shares on a deferred payment plan, enables the employees this year to buy preferred stock at $110 a share and common stock at $65 a share.

The mail car of the Southern Pacific Oregon express was robbed on January sixth of its registered mail while the train was running between Red Bluff and Redding, Cal. The two robbers bound and gagged the three mail clerks; and they escaped at the next station.

The Chicago & Eastern Illinois has advanced the wages of enginemen, firemen, conductors and brakemen, effective January 1, to the level of the scales paid on the Frisco lines west of the Mississippi river, this in accordance with an agreement reached last year by which the advance was to be made in two instalments. The present advance constitutes the second instalment.

The Pennsylvania Railroad finds that the capacity of its freight yards in 1897 aggregated accommodations for 103,789 cars; and in 1911 192,104 cars (lines east of Pittsburgh and Erie), an increase of 88,315 cars, or 85 per cent. The new yards at Northumberland afford track room for 5,944 cars. Facilities at Altoona have been more than trebled since the installation of the Hollidaysburg yard. These two are now required to do the work formerly done by the one at Altoona. Their combined capacity is nearly 16,000 cars.

A resolution has been introduced in congress by Representative Ayres, of New York, calling upon the Interstate Commerce Commission to investigate the repair shops of the railways belonging to the Trunk line association. It is declared that the differences in the cost of various things made by railways in their shops vary so greatly as between the shops of different roads that an investigation is needed. Railways are reporting higher costs for repairing cars and engines, yet the workmen in the shops do not see any benefit from the increase.

The New York, New Haven & Hartford has announced that the road from Stamford to Cedar Hill, a mile beyond New Haven, 41 miles, four-track all the way, is to be electrified and the work completed within two years. Operations will begin early next spring. With this extension the New Haven passenger trains will be drawn by electric locomotives 74 miles (New York to New Haven), and the new plans probably provide for the use of electric propulsion for both passenger and freight. The main line has a heavy freight traffic from New Rochelle to Cedar Hill, 58 miles.

The California legislature, at a special session, acting under the provisions of the recent amendments to the state constitution, has made changes in the Employers' Liability Law, both houses having passed Senate bills 11, 12 and 22. There will be an industrial accident board with authority in connection with all industries in the state; and employers failing to meet the requirements of the board are liable to penalties. Farmers, horticulturists, dairymen and a few other classes, are exempted. An appropriation has been made for the collection of data concerning accidents, with a view to formulating a basis for insurance and indemnity laws.

It is impossible to tell at the present time what the loss will be to the Harriman Lines from the burning of the Equitable building, 120 Broadway, New York, on January 9. Many of the records are contained in vaults on the third and fourth floors, including the stock transfer records, comptroller's books and accounts, corporate records and the treasurer's and secretary's accounts. It is probable that the records of W. V. S. Thorne, director of purchases, have been destroyed. The great bulk of the securities of the treasurer are kept in another building. The most serious damage will probably be the loss of the stock transfer records. The operating, traffic and legal departments had already been moved to the new office, 165 Broadway.

Thomas A. Edison, the inventor, held a short conference with officers of the Illinois Central on Saturday, January 6, and in an interview later convinced the Chicago newspapers that he had solved the problem of operating the Chicago railway terminals by electricity. W. L. Park, vice-president and general manager; M. K. Barnum, general superintendent of motive power, and C. F. Parker, purchasing agent, conferred with Mr. Edison and arrangements were made for an experimental test of three passenger motor cars to be equipped with storage batteries at the Edison shop. Mr. Edison asserted that the batteries can be charged in 40 minutes for a run of 200 miles. The Chicago Great Western has recently arranged for a test on a branch line of a similar car which has already been tried on the Long Island.

New Mileage Built and Cars Ordered by Electric Railways During 1911.

The total number of new miles of track laid by electric lines in the United States and Canada during 1911 was 1,191 miles, as compared with a total of 1,397 miles built in 1910. California heads the list of states with 120 miles, and North Carolina and Illinois each built 104 miles. The new cars of all kinds ordered by the electric railways totals 4,015 cars, which is a decrease of 1,466 from the number ordered in 1910. Of the total, 2,884 were city passenger cars, 626 interurban passenger cars, and 505 freight and miscellaneous cars.—*Electric Railway Journal.*

Governor Wilson Demands a Full Crew Law.

"We have done much toward securing justice and safety for the workingmen of the state in our factory laws, our tenement-house legislation, and our Employers' Liability act, but we have not done enough. Our workmen very justly demand further legislation with regard to the inspection and regulation of factories and work shops, and I recommend legislation of this kind to your very careful and earnest consideration. I recommend, moreover, the passage at an early date of an act requiring the railways operating within this state to provide their trains with adequate crews. Our sister state of Pennsylvania has adopted legislation of this kind, and the railways whose lines cross from Pennsylvania into New Jersey actually carry full crews to the border of this state, and then send their trains on through New Jersey with diminished crews, to the jeopardy, as I believe, of life and property; requiring more of the small crew than it can safely and thoroughly do."—Annual message of the governor of New Jersey.

U. S. Unfilled Tonnage.

The monthly statement of the United States Steel Corporation shows unfilled orders on December 31 amounted to 5,084,761 tons, as compared with 4,141,955 tons on November 30; 3,694,328 tons on October 31, and 2,674,757 tons on December 31, 1910. Unfilled tonnage at the end of the year was the highest since March, 1910, at the end of which month this item amounted to 5,402,514 tons. At the end of 1906 unfilled tonnage stood at 8,489,718 tons,

the largest ever recorded by the company. The United States Steel Corporation has a capacity of about 43,000 tons a day, so that orders now on hand would be sufficient to keep the various plants running full for a four months' period if no more orders were booked. Operations, however, are at 85 per cent. capacity, which is equal to about 37,000 tons a day, or more than 11,000,000 tons a year.

Business of Soft Coal Roads in 1911.

Authorities differ as to the volume of bituminous coal produced during 1911, but from the forecasts available at this time, in the light of the usual increase in tonnage produced during November and December, it would seem a conservative prediction that the production will be little, if any, in excess of that for the year 1910.

Coal trade during the first half of this year was undoubtedly much depressed on account of the slackened business of industrials; this is especially true regarding the steel manufactures. Despite the restricted output of bituminous coal, with a few exceptions, the principal carriers of that commodity show increased gross revenues for the ten months' period ended October 31, 1911. The Baltimore & Ohio and the Western Maryland are the principal soft coal carriers to suffer reduction in revenues. Norfolk & Western, the Chesapeake & Ohio and the Virginian Railway, by reason of their location in the midst of rapidly developing soft coal fields in the Virginias and Kentucky, have naturally shared in the advance of bituminous production in that locality.

The latest reports available in connection with the soft coal traffic show that ten leading roads of the East carried 113,381,803 tons during the ten months ended October 31, compared with 112,294,031 tons in the same period of same year, a gain of 1,087,772 tons, or 0.97 per cent. Shipments to the five Atlantic coal ports during the period above mentioned show an advance from 21,508,798 tons last year to 22,316,286 tons this year, an increase of 807,488 tons, or 3.76 per cent. Among these ports Norfolk showed the largest gain in tonnage of bituminous coal, indicating some advance in the coal tonnage of Norfolk & Western eastbound.—*Wall Street Journal.*

Burlington Organizes Department of Safety.

Darius Miller, president of the Chicago, Burlington & Quincy, has addressed a circular letter to each of the 45,000 employees of this road, announcing the organization of a department of safety similar in its general plan to the safety committees formed on the Chicago & North Western, the St. Louis & San Francisco, the Baltimore & Ohio, the Chicago Great Western and the Delaware, Lackawanna & Western.

The department will be in charge of E. M. Switzer, who will have the title of superintendent of safety, and will be assisted by a central or advisory committee, with headquarters at Chicago. On each operating division there will be a sub-committee, with separate sub-committees for some of the more important shops and other places where large numbers of men are employed. These sub-committees will be composed largely of employees from the different classes of service, supplemented and assisted by certain of the division officers. The sub-committees will meet monthly, and will be expected to report and discuss all matters that have come under their observation involving the safety of employees or others, and to endeavor to enlist the co-operation and interest of all employees in the promotion of safety.

The central or advisory committee will consist of the following: E. P. Bracken, assistant general manager; J. A. Connell, attorney Iowa lines; J. A. Denney, medical director and assistant superintendent relief and employment departments; W. L. Breckenridge, engineer maintenance of way; J. W. Cyr, superintendent motive power lines east of Missouri river; T. Roope, superintendent motive power lines west; L. B. Allen, general superintendent Nebraska district; A. W. Newton, general inspector permanent way and structures.

In his circular to employees Mr. Miller says in part:

"It is very plain to those who have the duty of investigating injuries to persons that a great many of them are entirely unnecessary, and would not have occurred if proper precautions had been taken. The object in sending this personal letter to you is to solicit your interest in the matter of preventing personal injuries of every character, and to secure your earnest co-operation with the local committee which will be formed in your territory. I hope you will inform yourself regarding your committee and support its work. This you can do in large measure by avoiding all unnecessary risks in your own work and using all possible care to avoid injuries to yourself or your co-employees. The company will continue its efforts to reduce and remove, as far as possible, the elements of danger that may surround your work, and you can assist it by reporting to your superior officer conditions of ways or structures that appear to threaten injury, dangerous methods of work that can be improved, or careless employees whose conduct is likely to produce injury to themselves or others.

"If every employee on the Burlington will respond to this request for co-operation and assistance, we believe that by the exercise of greater care on the part of employees, and the provision of better safeguards on the part of the company, a very large decrease in the number of injuries can be accomplished, and much pain, unhappiness and loss of time on the part of employees and others can be avoided."

Chicago Great Western Station Agents' Association.

The Chicago Great Western Station Agents' Association was recently organized for the purpose of bringing station agents and station employees into closer relationship with each other and with heads of departments. The plan adopted by the educational committee in organizing this association contemplated a local organization on each division, each local organization to be part of a general association comprising the whole system. These local associations have been organized and successful meetings have been held on several divisions. These have been attended not only by the agents and station employees of the divisions represented, but by officers. Following the business meeting, enginemen, trainmen and other employees were invited to join in a good fellowship gathering. A meeting of the northern division was held at St. Paul on November 25.

It is now proposed to hold a general get-together meeting, or, in fact, two meetings, one to complete the organization of the Station Agents' Association, and another to be in the nature of a good fellowship meeting in the evening. These meetings will be held at Oelwein, Iowa, on January 27, and will be attended by representatives from all divisions. Enginemen, trainmen, yardmen and office men are invited to the evening meeting. Later a similar organization may be formed for the shop men, roundhouse men, track and bridge men. Some officers, including General Manager H. J. Slifer, will be in attendance, but it is announced that the meeting is to be entirely in the hands of the employees, who will be expected to do most, if not all, of the talking. The employees are asked to come prepared to take up any subject which they think will be of interest to their fellow workers; but there are four suggested by the company as especially profitable for discussion as follows:

1. How can I increase the revenue of the company?
2. How can I improve the freight or passenger service of the company?
3. How can I effect economies for the company?
4. How can I advance the welfare of the company?

In the circular addressed to employees by General Manager Slifer to announce the meeting, he said:

"I consider myself an employee with the rest of you, and I expect to be on hand as an employee—not as an official—and as I said before, I want to see as many of my fellow employees there as possible, and I want as many of you who feel so inclined to prepare short papers on one or more of the topics mentioned above, or on any other topic that you may see fit to bring up for discussion. You may not have the gift of making extemporaneous speeches, but you can put your thoughts on paper and read them. If you do not want to do this or if you will not be able to attend the meeting, prepare your paper anyway and send it to the secretary, H. Ernest, who will read it for you. To make it even easier for you I will agree to have your paper read even if it is not signed, provided of course there is nothing objectionable in it. We want your thoughts and suggestions and do not want to be deprived of them on account of a little modesty on your part. Simply send in your ideas and they will be read at the meeting, although I would much prefer to have the author present to read them in person."

Railway Appliances Association.

The Railway Appliances Association will hold its fourth annual exhibit of appliances used in the construction, maintenance and operation of railways at the Coliseum, Chicago, March 18 to 23, inclusive, at the time of the annual convention of the American Railway Engineering Association. The exhibit will occupy not only the entire main floor, annex and balcony of the Coliseum, as in previous years, but also the First Regiment Armory, Michigan avenue and Sixteenth street, containing 16,000 sq. ft. of net floor space for exhibit purposes, which, with the Coliseum, will give a total of 54,000 sq. ft. of exhibit space. In spite of the additional amount of space available this year, practically all, or over 50,000 sq. ft., has already been reserved by the different exhibitors.

Many of those who have exhibited in former years have reserved larger spaces for the display of their exhibits this year than before, and there are many new exhibitors in the list, including several manufacturers of appliances pertaining more to the mechanical than to the construction or maintenance departments. On Tuesday of the week devoted to the exhibits, the American Railway Engineering Association will adjourn its session at 4 p. m. for the purpose of giving the railway men an opportunity to devote the remainder of the afternoon and evening to the inspection of the exhibits.

Applications for space should be made to Bruce V. Crandall, secretary, 537 South Dearborn street, Chicago.

Following is a list of exhibitors who have secured space:

Adams & Westlake Co., Chicago.
Ajax Forge Co., Chicago.
Alexander Crossing Co., Clinton, Ill.
American Casting Co., Birmingham, Ala.
American Concrete Pile and Pipe Co., Chicago.
American Guard Rail Fastener Co., Philadelphia, Pa.
American Hoist & Derrick Co., Chicago.
American Iron & Steel Manufacturing Co., Lebanon, Pa.
American Railway Signal Co., Cleveland, Ohio.
American Rolling Mill Co., Middletown, Ohio.
American Steel & Wire Co., Chicago.
American Valve and Meter Co., Cincinnati, Ohio.
American Vulcanized Fibre Co., Wilmington, Del.
American Well Works, Aurora, Ill.
Armspear Manufacturing Co., New York.
Asphalt Ready Roofing Co., New York.
Barrett Manufacturing Co., New York.
Bausch & Lomb Optical Co., Rochester, N. Y.
Beaver Dam Malleable Iron Co., Beaver Dam, Wis.
Blaw Collapsible Steel Centering Co., Pittsburgh, Pa.
Blocki-Brennan Refining Co., Chicago.
Boss Nut Co., Chicago.
Bossert Manufacturing Co., W. F., Utica, N. Y.
Bowser & Co., S. F., Fort Wayne, Ind.
Bryant Zinc Co., Chicago.
Buda Co., Harvey, Ill.
Buyers Index Co., Chicago.
Canton Culvert Co., Canton, Ohio.
Carey Co., Philip, Cincinnati, Ohio.
Carnegie Steel Co., Pittsburgh, Pa.
Carpenter & Co., George B., Chicago.
Chicago Bridge & Iron Works, Chicago.
Chicago Pneumatic Tool Co., Chicago.
Chicago Steel Tape Co., Chicago.
Cleveland Frog and Crossing Co., Cleveland, Ohio.
Clyde Iron Works, Chicago.
Columbia Nut & Bolt Co., Inc., Bridgeport, Conn.
Concrete Form and Engine Co., Detroit, Mich.
Conley Frog and Switch Co., Memphis, Tenn.
Cook's Standard Tool Co., Kalamazoo, Mich.
Crane Co., Chicago.
D. & A. Post Mold Co., Three Rivers, Mich.
Des Moines Bridge & Iron Works, Des Moines, Iowa.
Detroit Graphite Co., Chicago.
Dickinson, Inc., Paul, Chicago.
Dietzgen Co., Eugene, New York.
Dilworth, Porter & Co., Ltd., Pittsburgh, Pa.
Dixon Crucible Co., Joseph, Jersey City, N. J.
Drouve Co., G., Bridgeport, Conn.
Eastern Granite Roofing Co., New York.
Economy Spearable Switch Point Co., Inc., Louisville, Ky.
Edison, Inc., Thomas A., Orange, N. J.
Electric Railway Journal, New York.
Electric Storage Battery Co., Philadelphia, Pa.
Fairbanks, Morse & Co., Chicago.
Federal Cement Tile Co., Chicago.
Federal Signal Co., Albany, N. Y.
Foster, Frank M., Columbus, Ohio.
Franklin Manufacturing Co. of Pennsylvania, Franklin, Pa.
Fruit Growers' Refrigerating & Power Co., Anna, Ill.
General Electric Co., Schenectady, N. Y.
General Railway Signal Co., Rochester, N. Y.
Greenlee Bros. & Co., Rockford, Ill.
Grip Nut Co., Chicago.
Hall Signal Co., New York, N. Y.
Handlan-Buck Manufacturing Co., Chicago.
Hart Steel Co., Elyria, Ohio.
Hatfield Rail Joint Manufacturing Co., New York.
Hayes Track Appliance Co., Richmond, Ind.
Hobart-Allfree Co., Chicago.
Hubbard & Co., Pittsburgh, Pa.
Indianapolis Switch & Frog Co., Springfield, Ohio.
Ingalls-Shepard Forging Co., Chicago.
Inland Steel Co., Chicago.
Interlocking Nut & Bolt Co., Pittsburgh, Pa.
International Automatic Signal Co., Chicago.
International Steel Tie Co., Cleveland, Ohio.
Johns-Manville Co., H. W., New York.
Jordan Co., O. F., Chicago.
Joyce-Cridland Co., Dayton, Ohio.
Kalamazoo Railway Supply Co., Kalamazoo, Mich.
Kerite Insulated Wire & Cable Co., New York.
Kernchen Co., Chicago.
Lackawanna Steel Co., Buffalo, N. Y.
Lebanon Engineering Co., Lebanon, Pa..
Lidgerwood Manufacturing Co., Chicago.
Lorain Steel Co., Chicago.
Lufkin Rule Co., Saginaw, Mich.
Lupton's Sons Co., David, Philadelphia, Pa.
Lutz-Lockwood Manufacturing Co., Aldene, Union Co., N. J.
Massey Co., C. F., Chicago.
Matthews & Rothermel, Chicago.
Milburn Co., Alexander, Baltimore, Md.
Moore & Sons Corp., Samuel L., Elizabeth, N. J.
Morden Frog & Crossing Works, Chicago.
Mudge & Co., Burton W., Chicago.
Nachod Signal Co., Philadelphia, Pa.
National Carbon Co., Cleveland, Ohio.
National Lock Washer Co., Newark, N. J.
National Malleable Castings Co., Chicago.
National Roofing Co., Tonawanda, N. Y.
National Surface Guard Co., Chicago.
Nichols & Bro., George P., Chicago.
Northwestern Manufacturing Co., Milwaukee, Wis.
Okonite Co., New York.
Spencer Otis Co., Chicago.
P. & M. Co., Chicago.
Patterson Co., W. W., Pittsburgh, Pa.
Pease Co., C. F., Chicago.
Pennsylvania Steel Co., Chicago.
Pittsburgh Steel Co., Pittsburgh, Pa.
Pocket List of Railway Officials, New York.
Potter-Winslow Co., Chicago.
Q. & C. Co., New York.
Rail Joint Co., New York.
Railroad Supply Co., Chicago.
Railway Age Gazette, New York.
Railway & Supplymen's Mutual Catalogue Co., Chicago.
Railway List Co., Chicago.
Railway Review, Chicago.
Ramapo Iron Works, Hillburn, Rockland Co., N. Y.
Roberts & Schaefer Co., Chicago.
Sandwich Electric Co., Sandwich, Ill.
Scherzer Rolling Lift Bridge Co., Chicago.
Sellers Manufacturing Co., Chicago.
Signal Engineer, Chicago.
Snow Construction Co., T. W., Chicago.
Standard Asphalt & Rubber Co., Chicago.
Standard Underground Cable Co., Pittsburgh, Pa.
Stark Rolling Mill Co., Canton, Ohio.
Strait Scale Co., Chicago.
Strauss Bascule Bridge Co., Chicago.
Templeton, Kenly & Co., Ltd., Chicago.
Trussed Concrete Steel Co., Detroit, Mich.
Union Switch & Signal Co., Swissvale, Pa.
U. S. Wind Engine & Pump Co., Batavia, Ill.
Universal Concrete Tie Co., New Orleans, La.
Universal Metallic Tie Co., Salt Lake City, Utah.
Verona Tool Works, Chicago.
Weber Chimney Co., Chicago.
Weir & Craig Manufacturing Co., Chicago.
Weir Frog Co., Cincinnati, Ohio.
Whall & Co., C. H., Boston, Mass.
Wharton, Jr., & Co., Incorporated, William, Philadelphia, Pa.
Wilson Railway Gate Co., Birmingham, Mich.
Winans Improved Patent Rail Joint Co., Portland, Ore.
Winslow Co., Horace L., Chicago.

Transportation Club of New York.

An annual exposition of travel and traffic, under the auspices of the Transportation Club of New York, will be held at the Grand Central Palace, New York, April 25-May 4, by the International Exposition Company of New York, under an arrangement entered into between the club and that company. This exposition will be patterned somewhat after similar expositions held successfully in London, England, and Berlin, Germany. The exhibits will be made by transportation companies and by health and other resorts, hunting camp sections and all allied interests. A Show Committee of five members of the club has been appointed to look after the details in co-operation with the International company. One of the principal functions of this committee will be the organization of an historical exhibit embracing all the interesting relics that can be found relating to the development of transportation from its inception. D. W. Pardee is secretary of the Transportation Club of New York.

American Society of Engineering Contractors.

The third annual meeting of the American Society of Engineering Contractors was held in New York, January 9. In the morning members of the society inspected the work being done by the New York Central & Hudson River, in connection with its new terminal, at the invitation of W. L. Morse, terminal engineer of the New York Central & Hudson River. A business meeting was held in the afternoon. In the evenig J. R. Wemlinger gave a talk on Methods and Costs of Driving and Pulling Steel Sheet

Piling. Major C. E. Gillette, Philadelphia, Pa., was elected president; H. J. Cole, New York, first vice-president, and J. Marshall, Regina, Canada, second vice-president.

American Electric Railway Association.

The annual conference of the executive heads of the member companies of the American Electric Railway Association will be held in New York, January 26. Only matters of pressing interest will be considered and a report of recommendation and instructions will be made to the executive committee. The regular mid-year meeting of the executive committee will also be held in New York, January 25. A banquet, of which the date has not yet been announced, will be given to the members of the executive committee and the visiting officials by the American Electric Railway Manufacturers' Association.

Cleveland Engineering Society.

At the regular meeting of the Cleveland Engineering Society, held in Cleveland, Ohio, January 9, an illustrated paper on Railway Signaling was presented by C. E. Denney, signal engineer of the Lake Shore & Michigan Southern. F. W. Ballard is secretary.

Western Society of Engineers.

W. C. Armstrong, bridge engineer of the Chicago & North Western, has been elected president of the Western Society of Engineers; A. Bennett, first vice-president; G. T. Seeley, second vice-president; E. C. Shankland, third vice-president, and A. Reichman, treasurer.

Railway Club of Pittsburgh.

At the meeting of the Railway Club of Pittsburgh, to be held in Pittsburgh, Pa., January 26, an illustrated paper on Oxy-acetylene Welding and Cutting will be presented by J. A. Warfel.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.; annual, May 7-10, Richmond, Va.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass.; annual, May 10-11, San Francisco, Cal.

AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, New York; next convention, Seattle, Wash.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill.; annual, June 18-21, Chicago.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carew building, Cincinnati, Ohio; 3d Friday of March and September; annual, March 17, Chicago.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York.

AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOC.—George Keegan, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Convention, 3d week in Oct., Baltimore, Md.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, Monadnock Block, Chicago; annual convention, March 19-21, 1912, Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOC.—J. W. Taylor, Old Colony building, Chicago. Convention, June 17-19, Atlantic City, N. J.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—M. H. Bray, N. Y., N. H. & H., New Haven, Conn.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wed., except June and August, New York.

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wemlinger, 13 Park Row, New York; 2d Tuesday of each month, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; annual, June 26, 1912, Quebec, Que.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago; annual convention, May 22, 1912, Los Angeles, Cal.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135 Adams St., Chicago; annual, June 24, 1912, New York.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conrad, 75 Church St., New York.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and Aug., Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—D. F. Jurgensen, 116 Winter St., St. Paul, Minn.; 2d Monday, except June, July and Aug., St. Paul.

ENGINEERS SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after 2d Saturday, Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va.; annual, May 15, Buffalo, N. Y.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11 Brussels; 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, Brown Marx building, Birmingham, Ala. Convention, July, 23-26, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio. Convention, August 15, Chicago.

IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August, Des Moines.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York; annual convention, May 14-17, Pittsburgh, Pa.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago. Annual convention, June 12-14, Atlantic City, N. J.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOC. OF U. S. AND CANADA.—A. P. Dane, R. & M., Reading, Mass. Convention, 2d week in September.

NATIONAL RAILWAY APPLIANCES ASSOC.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Meetings with Am. Ry. Eng. Assoc.

NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.

NORTHERN RAILWAY CLUB.—C. L. Kennedy, C., M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.

OMAHA RAILWAY CLUB.—H. H. Maulick, Barker Block, Omaha, Neb.; second Wednesday.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 2 Rector St., New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOC.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc. Ry. Elec. Engrs.

RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.; annual, May 12, 1912, Kansas City, Mo.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio. Convention, May 20-22, Buffalo, N. Y.

RAILWAY SUPPLY MANUFACTURERS' ASSOC.—J. D. Conway, 2135 Oliver Bldg., Pittsburgh, Pa. Meetings with M. M. and M. C. B. assocs.

RAILWAY TEL. & TEL. APPLIANCE ASSOC.—W. E. Harkness, 284 Pearl St., New York. Meetings with Assoc. of Ry. Teleg. Sups.

RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling; September, 1912, Buffalo, N. Y.

ST. LOUIS RAILWAY CLUB.—B. W. Fraumenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmonds, 3868 Park Ave., New York. Meetings with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.

TRAFFIC CLUB OF CHICAGO.—Guy S. McCabe, La Salle Hotel, Chicago; meetings monthly, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie, Pittsburgh, Pa.; meetings monthly, Pittsburgh.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago; annual, June 18, 1912, Louisville, Ky.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Dertoit, Mich.; meetings monthly.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.; August, 1912.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Wednesday in month except July and August, Chicago.

WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md.; annual, January 16-18, Chicago.

Traffic News.

The Nevada-California-Oregon Railway is now running trains regularly on its extension northward from its former terminus to Lakeview, Ore., 37 miles.

Press despatches from Boston report a serious congestion of freight on the steamship docks because of a strike of longshoremen, which began last week.

The fifth annual dinner of the Chicago Transportation Association was held on January 9 at the Auditorium Hotel, Chicago. William Hodgdon, freight traffic manager of the Pennsylvania Lines, was one of the speakers.

At New York on Friday last, five pence a bushel was paid for carrying 16,000 bushels of corn to London; said to be the highest rate for such service since 1891. It was an emergency shipment to fill a delayed contract.

The Chicago & Alton has restored its former fast freight schedules from Chicago to Kansas City, and St. Joseph, giving a second morning delivery. Last winter the Alton and other lines lengthened schedules to give a third morning delivery.

The Western Classification Committee has issued its docket for the semi-annual classification meeting to be held at Galveston on January 16. The docket includes a list of 404 subjects, among which are several that were disposed of at the Milwaukee meeting last summer, but in which the decisions have been opposed by shippers.

The Florida East Coast Railway is to be opened to Key West January 22, and the president of the United States, on behalf of the city of Key West, has invited foreign nations to be present at a celebration which will be held on that day. Many of the foreign ministers in Washington will go, or send representatives.

The transportation bureau of Wichita, Kan., has passed resolutions calling on Kansas senators and representatives in Congress to support legislation for the abolition of the commerce court. Endorsement is also given to the proposals to amend the act to regulate commerce so as to give the Interstate Commerce Commission the right to prescribe minimum as well as maximum rates, and to give it jurisdiction over coastwise steamship traffic and rates.

The Grand Trunk has withdrawn its offer of a commission of $3 on immigrant passengers, which was sent to the steamship lines a few weeks ago; and it is understood that the other railways taking passengers west from New York have agreed to admit the Grand Trunk as a partner in their immigrant office at Ellis Island, New York harbor. It is expected that a tariff will be issued showing emigrant rates over the Grand Trunk from New York to points in western Canada.

At a meeting of the Western Passenger Association on January 4, it was decided to make two cents a mile the minimum rate for conventions and special excursions. Homeseekers' rates are to be made on the same basis as last year. Action on summer tourist rates was postponed until next month. An effort is being made to bring about an increase of $2.50. The association also reaffirmed the rule previously adopted by it providing for an excess baggage charge on trunks over 45 in. long, equal to that for 10 lbs. for each inch of excess.

It is reported in Washington that negotiations between the American government and representatives of Canada, looking to a joint international commission to regulate railway rates between the United States and Canada, as the Interstate Commerce Commission regulates them in this country, have been given up, the British government apparently having decided that such a joint body would help promote reciprocity in trade, whereas the last election in Canada condemned the idea of reciprocity. Former Chairman Knapp, of the Interstate Commerce Commission, and the chairman of the Canadian commission, held a number of conferences on this subject last year.

All of the independent steel and iron companies in Alabama and Tennessee have decided to apply to the Interstate Commerce Commission for reductions in freight rates. They claim that the railways of the South, particularly the Louisville & Nashville and the Southern Railway, are maintaining high rates so that the United States Steel Corporation may continue to command the markets of the North and West to the detriment of the companies in the South. The principal point at issue is the freight on iron from the Birmingham and Tennessee districts to Ohio river points. In 1906 and the early part of 1907, the railways advanced freight rates on iron to Ohio river points $1 a ton. At first, when iron was selling at $15 a ton, the railways advanced the freight rate 50 cents a ton, and then, when the price of iron advanced to $20 a ton, the railways, according to these steel men, imposed a further charge of 50 cents. No objection was made to these advances at the time, the iron and steel companies doing a profitable business and having no objection to the railway sharing in that prosperity.

The activities of the Southern Railway in promoting agriculture in all its branches throughout the states traversed by the company's lines, have been frequently noticed in these columns. Speaking of the success of this work, an officer of the road tells us that on the occasion of one of the educational excursions in southern Virginia some time ago, an agent of the land and industrial department of the road took the names and addresses of a large number of farmers attending the lectures; and on sending out a circular letter, a year later, he received replies from 48 of these men, almost everyone of whom told of specific benefits which he had derived from listening to the lectures. There is no doubt that much improvement is accomplished which cannot be measured. The United States agricultural department at Washington reports increases in the average yields per acre of all crops reported on in each of the states traversed by the Southern Railway Lines, and the officers of the railway feel justified in believing that their agricultural instruction trains are to be credited with some of this improvement.

The Long Island Railroad Company has issued a circular showing that 9,046 buildings were erected on Long Island (exclusive of Long Island City and old Brooklyn) during 1911. Of this number 7,429 were dwellings, 820 stores, 44 factories and 753 miscellaneous. The total shows an increase of 529 over the previous year, and compared with the number of structures put up in 1905—when the road first started to make compilations of building operations—it indicates a gain of over 50 per cent. For the benefit of prospective homeseekers and others, the circular contains a map showing where the residential sections are located, where factories can be built, where the best summer resorts are found, where farms are under cultivation, and where golfers, fishermen and huntsmen may find these pleasures. On September 8 last, the Long Island completed its first year's operation of trains to and from New York City through the Pennsylvania Railroad's East river tunnels. During that period the Long Island took about six million passengers to or from the Pennsylvania station in Manhattan, in 87,000 trains. During the year previous to the opening of the tunnels there were 137,937 commutation tickets sold on Long Island, while during the first year of the operation of the tunnel route, there were 151,931 tickets sold—an increase of 19,994. The Long Island road has spent enormous sums of money and is still making large expenditures for new cars, new stations and the elimination of grade crossings. Work is now under way on the North Side division, which involves the construction of a new line between Woodside and Winfield, and the electrification of the line to Port Washington and Whitestone Landing, together with the abolition of many grade crossings.

INTERSTATE COMMERCE COMMISSION.

The commission has suspended until May 11 the proposed advances (amounting to about 10 per cent.) on bituminous coal made by the railways in western Trunk Line Association territory.

Commissioner Prouty has been elected chairman of the commission, to succeed Chairman Clements. This is in accordance with a rule adopted last year that the term of office of the chairmanship should be limited to one year and be filled from year to year by different members in the order of seniority in service.

The iron and steel manufacturers of the Youngstown district of Ohio have filed a complaint with the Interstate Commerce Commission attacking the rate of 56 cents a ton on iron ore from Ashtabula harbor, the rate of $1.35 a ton on coke from the Connellsville district, and the 70-cent rate on coal from the Pittsburgh district.

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF NOVEMBER, 1911.

Name of road.	Mileage operated at end of period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance										
		Freight.	Passenger.	Total, inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	General.	Total.					
Alabama & Vicksburg	142	$114,529	$38,527	$163,406	$21,293	$33,006	$3,871	$53,684	$5,066	$116,920	$46,486	—$346	$5,726	$40,414	$875
Alabama Great Southern	309	300,102	89,967	424,618	48,346	95,817	10,701	127,724	10,373	292,961	131,657	—462	15,048	116,147	21,910
Ann Arbor	291	130,059	43,397	185,165	20,828	17,755	4,189	64,094	7,662	114,528	70,637	—307	13,986	56,344	—209
Arizona Eastern	366	114,308	35,285	159,538	25,043	14,883	2,044	42,176	5,882	90,028	69,510	159	14,000	55,669	13,165
Atchison, Topeka & Santa Fe	7,613	5,597,335	1,879,533	8,054,811	1,114,668	1,115,169	177,119	2,270,227	157,009	4,834,192	3,220,619	.....	328,308	2,892,311	—63,319
Atlantic Coast Line	4,523	2,016,241	636,956	2,855,684	344,509	405,776	42,118	956,385	70,646	1,819,434	1,036,250	.....	107,000	928,250	—19,623
Baltimore & Ohio—System	4,433	6,000,319	1,110,655	7,583,335	924,955	1,361,639	168,753	2,735,350	165,264	5,355,961	2,227,374	—64,443	248,805	1,914,126	333,518
Baltimore & Ohio Chicago Terminal	77	.....	1,916	143,054	25,020	21,671	751	61,864	3,645	112,951	30,103	841	18,206	12,738	17,010
Bangor & Aroostook	627	211,872	53,676	278,220	46,519	33,274	5,401	85,322	10,268	180,784	97,436	.....	9,250	88,186	7,197
Bessemer & Lake Erie	203	542,002	23,089	574,424	77,665	118,031	6,405	169,401	7,819	379,321	195,103	.....	7,000	188,103	23,676
Boston & Maine	2,224	2,397,182	1,188,370	3,862,080	553,468	497,576	28,578	1,720,911	73,794	2,874,327	987,753	15,560	178,586	824,727	—29,563
Buffalo, Rochester & Pittsburgh	572	655,480	77,455	753,104	75,319	152,682	9,358	261,564	16,504	515,427	237,677	—75	17,000	220,602	—46,036
Butte, Anaconda & Pacific	46	75,138	5,909	86,878	13,094	19,325	635	41,726	2,451	77,231	9,647	.....	2,850	6,797	—2,495
Carolina, Clinchfield & Ohio	238	172,005	10,582	186,162	11,131	21,254	5,803	37,145	7,396	82,729	103,433	.....	8,000	95,433	30,828
Carolina, Clinchfield & Ohio of S. C.	17	11,015	1,541	12,880	811	78	928	2,930	540	5,287	7,593	.....	500	7,093	2,675
Central of Georgia	1,915	833,621	299,681	1,251,803	154,842	197,920	36,575	415,588	49,078	854,003	397,800	4,118	43,080	358,838	—32,406
Central of New Jersey	671	1,765,915	417,801	2,311,190	269,159	312,417	27,005	678,415	43,786	1,330,782	980,408	—16,830	95,238	865,340	36,505
Central New England	276	276,621	24,215	314,973	41,222	20,745	1,460	82,504	2,616	148,547	166,426	—155	9,000	157,271	45,110
Charleston & Western Carolina	340	126,310	31,482	167,841	32,615	24,555	3,155	65,261	3,936	129,522	38,319	.....	5,000	33,319	—25,899
Chesapeake & Ohio Lines	2,241	2,135,685	402,767	2,651,817	353,098	516,385	52,065	825,663	64,471	1,811,682	840,135	—3,313	68,083	768,739	—85,222
Chicago & Alton	1,025	860,835	295,994	1,245,791	187,672	264,835	42,135	478,427	35,054	1,007,123	237,668	—3,632	36,500	197,536	11,548
Chicago & Eastern Illinois	1,275	1,052,430	221,068	1,371,321	149,694	262,872	31,361	510,637	41,051	995,615	375,706	—4,756	38,500	332,450	—21,330
Chicago & Erie	269	362,216	55,220	459,337	55,577	75,244	19,047	219,729	11,471	381,068	78,269	.....	16,450	61,819	11,751
Chicago & Northwestern	7,764	4,044,525	1,516,099	6,246,301	732,741	810,178	128,725	2,622,779	118,368	4,412,791	1,833,510	—4,983	275,000	1,553,527	—302,041
Chicago, Burlington & Quincy	9,074	5,225,755	1,645,749	7,563,299	720,615	1,270,279	124,659	2,500,973	168,752	4,803,278	2,760,021	—14,682	264,412	2,480,927	—187,388
Chicago Great Western	1,496	765,985	230,432	1,079,289	129,358	153,828	45,377	451,616	36,628	816,807	262,482	—190	33,037	229,255	—21,504
Chicago, Indiana & Southern	359	282,793	21,871	313,481	45,642	71,768	6,764	122,482	8,155	254,811	58,670	36	13,900	44,806	—41,750
Chicago, Indianapolis & Louisville	616	338,745	126,222	515,733	75,206	74,345	16,055	199,730	14,673	380,009	135,724	.....	23,414	112,310	12,584
Chicago, Milwaukee & Puget Sound	2,058	1,155,212	205,362	1,406,043	76,229	162,069	49,157	545,838	18,075	851,368	554,675	14,205	79,334	489,546	—207,727
Chicago, Milwaukee & St. Paul	7,511	3,804,002	1,043,376	5,402,186	617,730	783,047	103,665	2,282,694	85,346	3,872,482	1,529,704	—12,868	239,948	1,276,888	152,456
Chicago, Peoria & St. Louis	255	110,420	26,174	144,309	17,019	26,456	7,296	66,439	6,340	123,550	20,759	.....	4,300	16,459	7,222
Chicago, Rock Island & Gulf	476	208,623	51,678	277,289	24,904	22,424	10,267	92,037	8,207	157,839	119,450	—189	1,400	117,861	—42,410
Chicago, Rock Island & Pacific	7,551	3,576,134	1,435,861	5,352,991	759,405	692,008	155,874	2,137,365	137,916	3,882,568	1,470,423	—20,551	232,480	1,217,392	—487,930
Chicago, St. Paul, Minneapolis & Omaha	1,743	918,659	375,392	1,392,113	112,051	150,469	25,305	578,077	29,520	895,422	496,691	—468	68,530	427,693	—111,499
Chicago, Terre Haute & Southeastern	351	149,430	15,503	168,926	24,598	22,972	2,646	51,405	7,455	109,076	59,850	—198	8,700	50,952	.....
Cincinnati, New Orleans & Texas Pacific	337	613,831	136,574	790,316	89,100	178,938	20,555	227,475	18,532	534,600	255,716	—2,396	21,800	231,520	—10,653
Cincinnati, Hamilton & Dayton	1,014	620,646	117,610	837,504	89,562	131,358	17,976	356,190	20,258	615,344	222,160	.....	40,692	181,468	5,275
Cincinnati Northern	245	89,469	14,688	109,443	19,624	16,170	2,537	47,068	2,902	88,301	21,143	.....	5,700	15,443	—10,869
Cleveland, Akron & Cincinnati	344	245,491	62,287	326,967	39,859	58,435	4,027	110,566	5,111	217,998	108,969	.....	19,900	89,969	12,366
Cleveland, Cincinnati, Chic. & St. Louis	2,010	1,733,046	572,181	2,532,303	287,122	454,992	69,839	1,030,100	55,540	1,897,593	634,710	—2,521	100,000	532,189	63,939
Colorado Midland	337	162,211	16,379	193,625	21,165	34,070	7,200	78,366	5,445	146,246	47,379	—294	8,000	39,085	15,020
Colorado & Southern	1,106	625,549	94,221	767,335	66,599	143,712	11,976	244,901	23,462	490,650	276,685	—1,017	24,700	250,968	—50,837
Cumberland Valley	162	184,149	54,862	250,930	37,432	34,090	5,074	80,344	6,825	163,765	87,165	559	5,141	82,583	2,654
Delaware & Hudson Co.—R. R. Dept	851	1,539,113	184,271	1,780,455	141,632	267,201	16,398	621,843	49,043	1,096,117	684,338	—2,419	50,000	631,919	—114,302
Delaware, Lackawanna & Western	930	2,446,093	604,612	3,248,928	320,671	519,539	63,510	963,236	67,564	1,934,520	1,314,408	44,730	178,590	1,180,638	—44,789
Denver, Northwestern & Pacific	214	77,266	11,535	93,152	14,645	13,944	1,924	41,137	3,888	75,538	17,614	.....	3,000	14,614	—20,248
Detroit & Mackinac	353	63,204	25,940	96,303	17,262	18,455	2,115	30,203	3,287	71,322	24,981	—36	8,522	16,423	—7,060
Detroit, Toledo & Ironton	441	129,748	12,687	153,380	29,218	18,602	2,767	72,606	5,038	128,231	25,149	—18	6,000	19,131	18,308
Duluth & Iron Range	190	348,349	23,059	378,884	126,058	54,093	710	115,630	12,623	309,114	69,770	—4,135	14,187	51,448	—104,012
Duluth, Missabe & Northern	328	371,649	35,604	416,052	109,389	51,998	1,526	128,324	14,385	305,622	110,430	—584	16,794	93,052	—64,186
Duluth, Shore Shore & Atlantic	622	149,097	81,816	244,590	33,848	26,751	10,634	100,118	6,521	177,872	66,718	57	18,000	48,775	—13,730
El Paso & Southwestern Co	901	554,309	79,598	665,410	78,878	80,457	11,596	182,326	23,229	376,486	288,924	—1,141	31,076	256,707	—2,609
Elgin, Joliet & Eastern	841	792,259	6	839,749	86,649	161,736	4,283	254,943	14,213	521,824	317,925	.....	16,725	301,200	60,044
Erie	1,995	3,183,864	692,568	4,182,024	422,189	677,539	89,886	1,433,909	91,013	2,714,536	1,467,488	7,063	163,026	1,311,525	15,303
Florida East Coast	583	167,003	88,082	294,493	61,436	40,533	4,827	100,806	8,631	216,233	78,260	.....	15,500	62,760	—3,718
Fort Worth & Denver City	454	359,806	112,119	492,911	40,642	65,623	6,218	158,724	14,039	285,246	207,665	—531	12,000	195,134	—32,756
Galveston, Harrisburg & San Antonio	1,338	648,589	245,416	943,576	111,708	200,056	35,756	369,527	27,178	744,225	199,351	—4,673	30,442	164,236	—173,279
Grand Rapids & Indiana	587	244,494	120,816	397,197	42,888	82,641	11,637	177,024	14,740	328,930	68,257	—50	22,965	45,242	—9,572
Great Northern	7,344	4,661,180	1,172,620	6,224,730	448,111	611,056	95,466	1,610,659	99,795	2,865,087	3,259,643	—25	238,823	3,120,795	704,713
Gulf & Ship Island	307	125,229	33,710	175,808	19,503	31,263	3,543	50,583	8,420	113,312	62,496	.....	4,452	58,044	—4,283
Gulf, Colorado & Santa Fe	1,603	969,199	254,078	1,295,960	197,001	165,027	30,622	455,323	33,633	881,606	414,354	.....	35,761	378,593	—29,549
Hocking Valley	352	562,543	67,144	664,775	69,902	103,510	8,304	202,312	16,128	400,156	264,619	.....	43,644	220,975	25,122
Houston, East & West Texas	190	83,931	28,338	118,538	25,024	12,960	1,784	40,922	4,276	84,966	33,572	.....	4,416	29,156	—9,072
Houston & Texas Central	789	357,863	154,881	547,612	72,797	107,138	19,037	229,260	21,708	449,740	97,672	—1,137	24,974	71,561	—89,898
Illinois Central	4,755	3,077,992	1,047,633	4,897,322	709,254	1,342,142	111,062	2,021,132	134,434	4,318,024	579,298	—19,156	230,798	329,344	—1,119,651
Iowa Central	558	238,779	87,910	288,728	43,384	48,203	8,108	133,514	8,797	242,006	46,722	.....	9,685	37,037	—36,660
Kansas City Southern	827	641,073	127,576	861,244	87,317	122,147	26,516	283,385	31,538	550,903	310,341	.....	34,612	275,729	—52,299
Lake Erie & Western	886	353,130	61,654	444,903	80,857	79,615	10,911	177,762	10,196	359,341	85,562	.....	19,886	65,676	15,377
Lake Shore & Michigan Southern	1,775	2,626,261	797,723	3,933,994	384,104	507,271	81,776	1,369,438	71,134	2,413,723	1,520,271	—7,837	170,000	1,342,434	470,316
Lehigh & Hudson River	96	141,883	3,687	146,659	16,642	20,499	1,322	47,026	3,506	88,995	57,664	.....	3,500	54,164	117
Lehigh Valley	1,431	2,850,979	358,226	3,320,232	356,956	518,227	80,499	1,097,351	67,021	2,120,054	1,200,178	—3,667	124,600	1,071,911	—47,816
Long Island	398	303,833	446,457	780,819	121,822	114,880	12,529	404,401	21,237	674,869	105,950	40,029	53,553	92,426	8,956
Louisiana & Arkansas	255	110,063	19,734	134,248	16,615	19,387	2,447	35,566	4,862	78,877	55,371	.....	3,650	51,721	5,014

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF NOVEMBER, 1911—(CONTINUED).

Name of road.	Mileage operated at end of period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total, inc. misc.	Maintenance: Way and structures.	Maintenance: Of equipment.	Traffic.	Transportation.	General.	Total.					
Louisiana Ry. & Navigation	350	$145,356	$23,806	$180,775	$18,969	$12,758	$6,040	$70,182	$6,745	$114,694	$66,081	.....	$4,900	$61,181	$28,006
Louisville & Nashville	4,704	3,623,082	931,103	4,853,988	723,584	799,197	96,442	1,561,167	85,340	3,265,730	1,588,258	—$10,087	148,950	1,429,221	—39,050
Louisville, Henderson & St. Louis	199	69,042	31,117	106,290	22,457	13,178	4,022	37,898	2,890	80,445	25,845	373	3,000	23,218	1,251
Maine Central	1,179	613,203	233,929	898,734	154,273	112,798	7,113	322,655	37,205	634,044	264,690	—2,768	44,244	217,678	27,010
Michigan Central	1,804	1,737,995	589,180	2,586,718	242,052	302,612	61,273	1,032,649	41,881	1,680,467	906,251	5,624	130,000	781,875	244,100
Midland Valley	373	97,576	40,186	145,551	27,609	21,659	2,653	44,282	6,965	103,168	42,383	191	5,483	37,089	—8,142
Minneapolis & St. Louis	1,027	262,032	86,122	378,878	40,428	49,330	11,125	180,601	12,808	294,292	84,586	—155	20,334	64,097	—35,324
Missouri, Kansas & Texas	1,743	973,930	342,577	1,399,255	175,603	194,885	38,469	486,624	41,054	936,635	462,620	—4,676	48,500	409,444	—230,940
Missouri, Kansas & Texas of Texas	1,345	773,838	365,767	1,193,825	208,233	106,011	25,892	583,638	36,666	960,440	233,385	1,045	50,000	184,430	—200,036
Mobile & Ohio	1,114	855,059	112,710	1,033,841	116,698	191,280	30,378	358,234	32,606	729,196	304,655	—771	24,595	279,279	—31,201
Monongahela	64	100,734	2,220	104,508	10,474	6,696	536	22,390	2,036	42,132	62,376	.....	4,000	58,376	15,282
Nashville, Chattanooga & St. Louis	1,255	745,647	220,981	1,041,475	158,600	195,080	40,613	382,669	25,735	802,697	238,778	—1,384	23,816	213,578	—32,605
New Orleans & North Eastern	195	263,346	51,707	337,140	35,318	62,532	8,759	125,772	11,608	243,989	93,151	163	8,250	85,064	—4,745
New Orleans Great Northern	282	99,004	26,499	137,019	22,161	19,242	3,008	45,902	7,688	98,001	39,018	—94	2,000	36,924	—410
New Orleans, Mobile & Chicago	404	137,021	26,809	173,853	22,425	18,296	3,070	49,598	8,772	102,161	71,692	—11	4,807	66,874	—13
New York Central & Hudson River	3,591	5,526,335	2,334,184	8,791,727	1,140,415	1,469,594	137,842	3,351,709	217,035	6,316,595	2,475,132	55,008	637,853	1,892,287	—4,873
New York, Chicago & St. Louis	561	810,310	135,518	982,949	99,714	98,297	40,867	375,318	15,355	629,551	353,398	—1,919	44,000	307,479	88,922
New York, New Haven & Hartford	2,091	2,748,205	2,141,224	5,364,635	570,697	630,535	35,744	2,083,316	149,758	3,470,050	1,894,585	133,175	310,000	1,717,760	—29,112
New York, Ontario & Western	565	585,350	82,204	692,772	99,423	123,719	9,246	281,162	16,226	529,776	162,996	—7,566	17,917	137,513	—36,932
New York, Philadelphia & Norfolk	112	221,534	35,817	277,887	30,161	52,714	4,123	108,909	11,998	207,905	69,982	.....	7,500	62,482	—6,964
New York, Susquehanna & Western	152	172,454	46,792	248,808	21,660	19,099	2,030	96,947	4,511	144,247	104,561	7,250	17,874	93,937	—3,426
Norfolk & Western	2,004	2,821,092	321,793	3,258,598	351,716	636,602	48,421	966,145	65,880	2,065,764	1,192,834	—2,773	115,000	1,075,061	148,684
Norfolk Southern	607	190,097	62,378	272,181	30,531	30,459	5,329	86,406	14,254	166,979	105,202	—460	7,500	97,242	11,187
Northern Central	472	907,854	179,646	1,155,017	13,571	255,377	15,076	569,405	22,781	876,210	278,807	454	40,337	238,924	147,965
Northern Pacific	6,018	4,259,296	1,241,412	5,856,636	485,436	561,177	101,418	1,858,117	75,068	3,081,216	2,775,420	25,645	292,822	2,508,243	30,506
Oregon Short Line	1,689	1,412,361	386,239	1,906,685	171,008	184,983	21,921	477,318	35,411	890,641	1,016,044	—1,190	130,000	884,854	—65,443
Oregon-Washington R. R. & Nav. Co.	1,919	860,110	406,006	1,354,477	146,843	158,043	39,132	490,797	44,769	879,584	474,893	—1,205	165,000	308,688	.....
Pecos & Northern Texas	296	132,348	27,314	166,266	26,890	27,800	2,229	53,339	5,321	115,579	50,687	.....	6,353	44,334	11,056
Pennsylvania Co.	1,415	3,386,481	614,676	4,397,484	589,484	830,385	73,099	1,540,450	82,107	3,115,525	1,281,959	—4,888	173,181	1,103,890	—17,543
Pennsylvania R. R.	3,978	10,134,061	2,707,230	13,824,261	1,207,837	2,797,827	193,929	5,090,084	324,342	9,614,019	4,210,242	—146,376	605,931	3,457,935	—405,760
Peoria & Eastern	351	175,075	56,743	250,416	36,656	38,142	4,967	104,170	6,782	190,717	59,699	.....	10,500	49,199	2,831
Pere Marquette	2,331	1,114,658	300,697	1,527,863	190,969	230,793	35,018	680,128	30,814	1,167,722	360,141	—2,965	56,298	300,878	46,598
Philadelphia, Baltimore & Washington	713	762,852	651,697	1,590,341	207,029	287,314	25,670	660,073	34,534	1,214,620	375,721	.....	50,698	325,023	—54,522
Pittsburgh & Lake Erie	215	1,194,657	115,310	1,352,293	143,945	260,076	9,036	323,038	22,629	758,724	593,569	—645	30,530	562,394	—86,130
Pittsburgh, Cincinnati, Chic. & St. Louis	1,467	2,363,649	576,285	3,328,354	434,655	625,664	65,614	1,204,634	63,768	2,394,335	934,019	—863	123,027	810,129	51,075
Pittsburgh, Shawmut & Northern	240	112,347	7,961	122,248	12,978	24,357	1,127	34,054	3,896	76,412	45,836	.....	1,565	44,271	13,625
Richmond, Fredericksburg & Potomac	83	93,488	70,857	192,227	20,432	27,521	2,783	72,172	5,729	128,637	63,590	.....	1,094	62,496	—5,432
Rutland	468	168,094	92,783	293,485	30,729	35,880	8,092	116,907	6,533	198,141	95,344	.....	10,969	84,375	11,675
St. Joseph & Grand Island	319	76,677	31,170	119,789	32,309	17,564	5,010	66,774	5,375	127,032	—7,243	—31	5,711	—12,985	—15,964
St. Louis & San Francisco	4,731	2,567,107	876,630	3,699,154	503,287	456,479	82,518	1,241,165	102,843	2,386,292	312,862	.....	161,738	1,151,124	170,980
St. Louis, Brownsville & Mexico	509	117,641	57,518	190,757	42,551	13,302	3,373	65,847	8,006	133,079	57,678	.....	4,500	53,178	24,313
St. Louis Merchants' Bridge Terminal	9	.....	443	148,286	19,730	11,123	414	85,838	5,837	122,942	25,344	.....	6,150	19,194	—8,687
St. Louis, San Francisco & Texas	243	100,330	29,016	137,999	20,410	15,098	3,127	53,960	4,847	97,442	40,557	.....	610	39,947	23,266
St. Louis Southwestern	796	589,658	114,934	752,548	75,516	109,476	32,615	175,018	22,967	415,582	336,956	—2,021	19,564	315,371	—20,615
St. Louis Southwestern of Texas	703	349,803	91,157	468,053	59,704	84,965	12,955	160,487	18,921	337,032	131,021	—111	10,000	120,910	74,137
San Antonio & Aransas Pass	727	275,804	105,719	407,684	63,801	46,661	5,718	145,574	9,926	271,680	136,004	.....	11,000	125,004	38,705
San Pedro, Los Angeles & Salt Lakes	1,113	466,211	191,950	708,652	111,111	190,719	31,586	291,613	18,792	643,821	64,831	—7,388	24,926	32,517	—137,940
Santa Fe, Prescott & Phoenix	364	100,268	44,385	152,443	21,623	12,191	2,998	41,326	5,670	83,808	68,635	.....	3,500	65,135	2,145
Southern	7,088	3,719,642	1,275,131	5,426,464	670,671	824,614	137,637	1,881,814	165,629	3,680,365	1,746,099	—3,284	196,724	1,546,091	—159,776
Southern in Mississippi	280	84,392	35,162	126,359	24,125	10,213	2,010	42,682	4,200	83,230	43,129	.....	4,992	38,137	—7,564
Southern Kansas of Texas	124	110,975	13,760	129,503	10,819	24,807	1,962	42,858	4,190	84,636	44,867	.....	3,535	41,332	171
Southern Pacific Co.	6,184	5,137,791	2,516,998	8,184,500	923,589	1,043,754	152,386	2,356,725	179,514	4,655,968	3,528,532	58,083	339,288	3,247,327	—238,452
Sunset	58	59,338	14,411	76,104	4,894	3,225	30	27,987	260	36,396	39,708	.....	3,390	36,318	—313
Syracuse, Binghamton & New York	80	51,579	31,302	94,482	10,146	6,537	2,703	34,825	2,292	56,503	37,979	.....	6,220	31,759	5,371
Tennessee Central	293	88,164	29,465	125,171	23,077	16,254	5,863	49,785	7,488	102,467	22,704	.....	4,212	18,492	—13,739
Terminal R. R. Ass'n of St. Louis	35	.....	252	239,419	32,613	23,276	592	92,206	6,535	155,222	84,197	9,566	29,400	64,363	—14,625
Texas & New Orleans	458	243,339	86,171	350,853	59,680	107,456	8,535	140,737	11,128	327,536	23,317	—483	12,248	10,586	—35,121
Toledo & Ohio Central	440	389,044	46,412	454,076	90,122	52,284	6,841	150,874	8,137	308,258	145,818	—926	26,795	118,097	—58,248
Toledo, Peoria & Western	247	63,045	34,746	103,315	17,364	22,627	2,524	41,647	3,266	87,428	15,887	.....	4,800	11,087	—1,366
Toledo, St. Louis & Western	450	280,055	34,444	335,198	42,580	63,531	7,630	128,689	10,110	252,540	82,658	.....	14,500	68,158	—30,588
Trinity & Brazos Valley	462	257,153	35,787	300,126	41,415	30,098	9,407	131,612	12,708	225,240	74,886	.....	5,835	69,051	1,599
Union Pacific	3,506	3,048,278	869,005	4,275,542	355,736	564,218	105,673	1,249,902	109,440	2,384,969	1,890,573	—6,610	175,150	1,708,813	—761,606
Union R. R. of Baltimore	9	111,493	19,940	133,594	14,862	.....	1,001	4,844	2,313	23,020	110,574	.....	5,922	104,652	—8,691
Union R. R. of Pennsylvania	31	.....	.....	324,125	25,272	74,331	106	124,261	3,171	227,141	96,984	3,550	10,000	90,534	32,624
Vandalia	827	578,305	190,059	856,696	100,248	171,892	23,842	346,150	18,083	660,215	196,481	.....	28,301	168,180	—90,745
Vicksburg, Shreveport & Pacific	171	90,344	44,088	145,641	26,964	20,341	3,304	41,279	4,539	96,427	49,214	113	6,300	43,027	—2,984
Virginia & Southwestern	240	130,103	12,239	145,627	18,529	31,813	1,842	42,264	5,288	99,736	45,891	.....	4,710	41,181	6,073
Virginian	471	373,530	18,956	403,850	49,486	78,265	5,189	120,187	7,724	260,851	142,999	5,273	13,000	135,272	776
Washington Southern	35	32,130	34,541	90,662	11,440	10,175	1,160	34,903	2,854	60,532	30,130	.....	3,245	26,885	3,803
West Jersey & Seashore	355	153,455	201,632	386,006	83,627	95,515	9,445	212,713	10,228	411,528	—25,522	—3,309	23,473	—52,304	—67,746
Wheeling & Lake Erie	457	545,287	43,859	636,708	66,950	112,324	7,054	214,712	15,844	416,884	219,824	3,157	29,900	193,081	57,739
Yazoo & Mississippi Valley	1,371	782,236	214,299	1,081,291	185,853	135,997	16,164	382,594	29,740	750,348	330,943	—1,117	38,000	291,826	—240,872

Discrimination by Elevation in Transit Rules.

William H. Suffern Grain Co. v. Illinois Central et al. Opinion by Commissioner Prouty.

A rule which provides that grain may be unloaded into elevators at Cairo, Ill., and reshipped at the balance of the through rate, the railway company paying the elevator company three-fourths of a cent per hundred pounds, but which does not provide for any elevation allowance to grain dealers at Decatur, Ill., discriminates against Decatur, and the discrimination is ordered discontinued. (22 I. C. C., 178.)

STATE COMMISSIONS.

The Washington railway commission has issued a general distance tariff reducing distributive freight rates to and from Seattle, Tacoma, Spokane, Everett, Bellingham, Aberdeen, Hoquiam, Chehalis, Centralia, Wenatchee, Pasco, Kenewick, North Yaquima and Walla Walla, effective May 1, by amounts ranging from 10 to 31 per cent.

The Louisiana Railway Commission, after an investigation of express rates within the state extending over the past year, has issued an order requiring many reductions in the present rates. The commission prescribes a maximum distance scale of merchandise rates, and also orders several changes in the rules governing express shipments, effective March 1.

The Board of Public Utility Commissioners of New Jersey has ordered all roads operating in that state to provide facilities for the use of drinking water by passengers on trains, and the order says that the arrangement made in some other states by railway companies, by which passengers can obtain individual paper cups without cost by applying to conductors, brakemen or porters, recommends itself to the board.

The Illinois railway commission at a meeting on January 3 denied a petition of the Mine Rescue State Commission of Illinois, asking the elimination of the $25 minimum tariff rate for the movement of mine rescue cars within the state. Representatives of the railways present opposed the elimination of the minimum as establishing a precedent which might be applied to other kinds of cars, but stated that the roads should be allowed to treat each case individually and to handle the mine rescue cars free if emergency required. The commission at this meeting established a rating of double first class on aeroplanes in the Illinois classification on the petition of the Illinois freight committee.

The Mississippi Commission on January 3 ordered the discontinuance of its freight classification, which has been in force for many years, and the adoption by the railways, for intrastate shipments, the same classification as that now used by them on interstate business, namely, Southern classification No. 38. One of the three commissioners voted against the resolution, and it is said that on January 15 the present commission goes out of office and that this change in classification may then be rescinded. The effect of the change on some commodities will be to raise the rates, while on others there will be a reduction; and, of course, every shipper whose goods have to pay a higher rate will clamor for the reversal of this action.

The Indiana Commission announces that on February 8 a conference and inquiry will be held on the subject of rails; and railway managers, engineers and other officers interested in rails, including purchasing agents, are notified to be present. Rail manufacturers may appear if they wish to do so. The commission hopes that the railways and the railmakers will act together harmoniously to secure the best rails. The preamble to the notice says that the commission is advised that the rails now being put in use are inferior to the "lighter grades" heretofore used, meaning, presumably, smaller sections. It is understood that the commission will seek the aid and counsel of the American Railway Engineering Association.

On complaint against the discontinuance of the use of the Pennsylvania station at Jersey City by the New York, Susquehanna & Western, the Board of Public Utility Commissioners of New Jersey made an investigation and came to the conclusion that while considerable inconvenience to the public would be caused by the abandonment of this station by the N. Y. S. & W., the board could not compel the Pennsylvania Railroad to permit the N. Y. S. & W. to continue to use and occupy its Jersey City station, and the board could not force the New York, Susquehanna & Western to employ condemnation proceedings to establish a permanent foothold in the Pennsylvania passenger terminal. The board disapproves of the action of the New York, Susquehanna & Western but has no jurisdiction in the matter.

Annual Report.

The New York State Public Service Commission, First district (New York City), has made its fifth annual report. During the year 1911 the commission has awarded subway contracts to the amount of $29,000,000, which, with the contracts awarded in previous years and not yet completed, make nearly $50,000,000 worth of work now going on. The commission has made substantial progress on the execution of the city transit programme as agreed upon with the Board of Estimate of the city. It recommends a law providing that reorganized companies shall be required to get approval of new securities, as is now the case with solvent companies; also that the courts be prohibited from reviewing the commission's orders by certiorari. It is recommended that a bill be passed providing a method of exempting self-sustaining rapid transit bonds issued after January 1, 1910.

An appropriation of $1,000,000 for the elimination of grade crossings is asked for. Applications for approval of issues of stocks and bonds during the past year, in cases other than reorganization, have aggregated $79,914,177. There are now 97 operating and lessor transportation corporations subject to the jurisdiction of the commission, with an aggregate capitalization of $1,124,342,471.

The per capita expenditure of the public of New York City for 1910 is estimated at $16.35 for transportation, $6.68 for gas and $5.32 for electricity, a total of $28.35, and the expenses of the commission in supervising such public utilities were $377,000, a per capita expense of eight cents.

A chapter is devoted to service facilities, the principal improvements effected during the year being pointed out.

COURT NEWS.

The Missouri supreme court has sustained the validity of a law of that state requiring railway companies to maintain passenger service on Sunday on branch lines of a certain minimum length.

The government has filed in the United States supreme court at Washington an appeal from the lower court in the case of the Interstate Commerce Commission, the Federal Sugar Refining Company and others against the Baltimore & Ohio and the Central of New Jersey. This is a suit concerning alleged discriminatory allowances by the railways for lighterage at eastern termini on westbound shipments of sugar.

The opinion of the Supreme Court delivered by Justice McKenna says that under federal law before a common carrier can accept freight for transportation it must publish its rates and regulations. Congress having exercised its power to regulate interstate commerce in this way, the state was precluded from legislating on the same subject. It was manifestly a conflict of power between the federal and the state authorities, and in that case the state should give way. The case was reversed and remanded.

The Supreme Court of the United States this week handed down a decision invalidating the law of the state of North Carolina which requires common carriers to accept for transportation freight offered at any regular station of the carrier and to transport it. The decision was in the case of the Southern Railway against Reid. The statute provides a penalty for each day that the carrier holds the goods after receiving them and before forwarding them. The Supreme Court of North Carolina had held it to be constitutional.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

David Z. Cowden has been appointed tax attorney of the Southern Pacific, with office at San Francisco, Cal., succeeding Jere T. Burke, deceased.

H. E. Bissell has been appointed right-of-way and claims agent of the Grand Trunk Pacific, with office at Winnipeg, Man., succeeding George H. Pope.

Lucius Laudie has been appointed auditor of the Salt Lake & Mercur, with office at Salt Lake City, Utah, succeeding P. E. Long, resigned to go into other business.

S. B. Haupt, general manager of the Susquehanna, Bloomsburg & Berwick at Watsontown, Pa., has been elected also president, succeeding J. H. Cochran, deceased.

H. M. Watkins, auditor of freight accounts of the Oregon-Washington Railroad & Navigation Company at Portland, Ore., has been appointed assistant auditor of the Union Pacific, with office at Omaha, Neb.

N. M. Leach, traffic manager of the Texas & Pacific, with office at New Orleans, La., has been appointed also assistant to the president of the International & Great Northern. During the period of the receivership of the latter road Mr. Leach was its traffic manager.

L. Delano, assistant to general superintendent of transportation of the Atlantic Coast Line at Wilmington, N. C., has been appointed assistant to the president, with office at Wilmington, succeeding W. R. Sullivan, whose resignation has already been announced in these columns.

E. T. Jeffery, president of the Denver & Rio Grande, has been elected chairman of the board, with office at New York, succeeding George J. Gould. Benjamin F. Bush, president of the Missouri Pacific, has been elected also president of the Denver & Rio Grande, with office at St. Louis, Mo., succeeding Mr. Jeffery. A photograph of Mr. Bush, and a sketch of his career were published in the *Railway Age Gazette* of April 21, 1911, page 944.

The real estate and tax departments of the Missouri Pacific-Iron Mountain system having been consolidated, J. M. Seibert, general agent in the passenger department at St. Louis, has been appointed real estate and tax agent, with office at St. Louis, and E. S. Cronk, land agent at St. Louis, has been appointed assistant real estate and tax agent.

S. S. Butler, whose appointment as assistant to the vice-president in charge of traffic of the St. Louis & San Francisco Lines in Texas and Louisiana, with office at Houston, Tex., has been announced in these columns, was born August 25, 1875, at Murfreesboro, Tenn. He received a high school education in his native town, and began railway work November 1, 1890, with the Texas & Pacific at Dallas, Tex., remaining with that company for ten years. On November 1, 1900, he went with the St. Louis & San Francisco at Dallas as a soliciting agent, and was then consecutively traveling freight agent, commercial agent and general agent, having been appointed to the latter office, with headquarters at Ft. Smith, Ark., on April 1, 1907. He was appointed general Eastern agent, with office at New York, on October 1, 1909, from which position he was promoted as above, effective January 1.

Operating Officers.

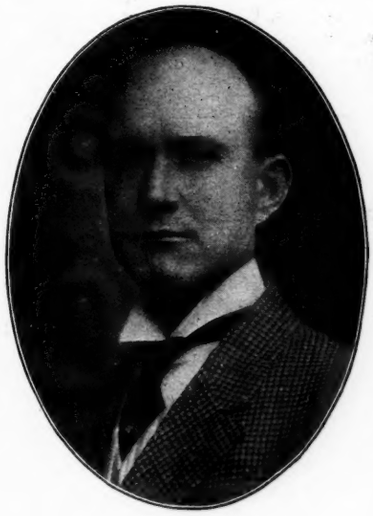
William Osborne has been appointed superintendent of the Atlantic Northern & Southern, with office at Atlantic, Iowa.

W. M. Cowhig has been appointed superintendent of transportation of the Southern Railway, with office at Washington, D. C.

S. L. Racey, chief despatcher of the Green River division of the Denver & Rio Grande at Helper, Utah, has been appointed chief despatcher of the Salt Lake division, with office at Salt Lake City, succeeding H. H. Hoover, resigned to accept service with another company. W. A. Nash succeeds Mr. Racey.

M. D. Rice, roadmaster of the Nevada-California-Oregon Railway, has been appointed assistant superintendent, with headquarters at Lakeview, Ore.

Alexander MacDonald Parker, whose appointment as superintendent of the Allegheny division of the Pennsylvania Railroad, has been announced in these columns, was born on June 25, 1870, at Carlisle, Cumberland county, Pa., and was educated at Dickinson College. He entered the service of the Pennsylvania Railroad in 1888 as a rodman, in which capacity and subsequent higher ones he was engaged for several years on survey work. In 1891 he was transferred to the assistant engineer's office on the Philadelphia division, and was later transferred to the principal assistant engineer's office at Altoona. In 1892 he was appointed assistant supervisor of the Philadelphia division at Lancaster, and four years later was transferred in the same capacity to the Philadelphia yard. He was appointed supervisor at Tyrone in 1897, and subsequently served in the same capacity on the Frederick, the Schuylkill and the New York divisions, becoming assistant to the principal assistant engineer in 1903. He was made principal assistant engineer in 1905, and upon the organization of the Hudson division at New York in 1909, Mr. Parker was appointed superintendent, which position he held until his recent appointment as superintendent of the Allegheny division, with office at Oil City, Pa.



A. M. Parker.

Charles S. Krick, whose appointment as superintendent of the Manhattan division of the Pennsylvania Railroad has been announced in these columns, was born on March 16, 1866, at Reading, Pa. He was educated at the public schools and at Carroll Institute, Reading, and graduated from La Fayette College in June, 1887. The following month he entered the service of the Pennsylvania Railroad as rodman on the Schuylkill division, and was later transferred to the Altoona office. From December 14, 1890, to May, 1895, he was assistant supervisor, first at Tyrone, then at Middletown, and later at Philadelphia, and was then appointed supervisor of the Schuylkill division. He was later transferred to the Middle division and then to the Pittsburgh division. In January, 1903, he was made assistant engineer of the Eastern & Susquehanna division, and later was transferred to the Philadelphia Terminal division. Mr. Krick was appointed principal assistant engineer of the Philadelphia, Baltimore & Washington in January, 1906, and in April of the following year he was made superintendent of the New York Terminal division. On January 1, 1912, when the Hudson division and the New York Terminal divisions were combined to form the Manhattan division, he was appointed superintendent of that division.

C. S. Krick.

E. M. Switzer has been appointed superintendent of safety of the Chicago, Burlington & Quincy, with office at Chicago. (See item in General News Section.)

Oliver T. Boyd, general passenger agent of the Hudson & Manhattan, has been appointed assistant general manager, with office at New York City.

H. H. Hoover, chief despatcher of the Denver & Rio Grande at Salt Lake City, Utah, has been appointed chief despatcher of the Southern Pacific, with office at Ogden, Utah.

F. G. Bement, formerly trainmaster of the Grand Trunk at Durand, Mich., has been appointed inspector of transportation of the Pere Marquette, with office at Detroit, Mich.

G. H. Hammond has been appointed superintendent of terminals of the Minneapolis, St. Paul & Sault Ste. Marie at Duluth, Minn., and Superior, Wis., with headquarters at the latter place.

The Southern Railway announces that on January 15, the general direction of the operations of the departments of maintenance of way and structures, maintenance of equipment and transportation will be trasferred to and directed by the chief engineer of maintenance of way and structures, the general superintendent of motive power and equipment, and the general superintendent of transportation, respectively, and the general superintendents of each district will report to and be governed by instructions issued by them. Questions relating to operation will be reported by general superintendents to the vice-president and general manager, as heretofore. The general superintendent of motive power and equipment will control and give direction to the inspection, care and use of coal for all purposes. The superintendent of transportation will direct the distribution of coal.

Traffic Officers.

W. H. Winnfield, soliciting freight agent of the St. Louis & San Francisco at Dallas, Tex., has resigned.

J. V. Styers has been appointed assistant general freight agent of the Bessemer & Lake Erie, with office at Pittsburgh, Pa.

R. J. Ross has been appointed commercial agent of the New York Central lines and fast freight lines, with headquarters at Winnipeg, Man.

S. G. Nethercot, chief of tariff bureau of the Chicago & Northwestern, has been appointed assistant general freight agent, with office at Chicago.

B. S. Barnes has been appointed acting foreign freight agent of the Erie Railroad with office at New York City, succeeding T. J. Skidmore, resigned.

P. O. Lee has been appointed traveling freight agent of the Georgia Southern & Florida, with headquarters at Cordele, Ga., succeeding H. W. Watson, resigned.

C. R. Strickler, agent of the Delaware, Lackawanna & Western at Des Moines, Iowa, has been appointed general agent of the Lackawanna Fast Freight Line, with headquarters at Peoria, Ill.

Harry C. Hilbourne has been appointed general agent of the passenger department of the Chicago Great Western, with office at Chicago, succeeding F. P. Lasier, resigned on account of illness.

Volney E. Huff has been appointed freight solicitor of the Star Union Line of the Pennsylvania Lines West and the Pennsylvania Railroad, in connection with the Indianapolis, Ind., agency.

R. B. Rawlins has been appointed traveling freight and passenger agent of the El Paso & Southwestern system and the Morenci Southern, with office at El Paso, Tex., succeeding H. L. Haynes, Jr., resigned.

William D. Corfield has been appointed division freight agent of the Philadelphia & Reading, the Perkiomen Railroad and the Stony Creek Railroad, with office at Philadelphia, Pa., succeeding J. J. Bergen, deceased.

N. M. Leach, traffic manager of the Texas & Pacific, with office at New Orleans, La., has been appointed also general traffic manager of the Opelousas, Gulf & Northeastern. (See item under Executive, Financial and Legal Officers.)

C. R. Carlton, city ticket agent of the Pennsylvania Lines West at Dayton, Ohio, has been appointed traveling passenger agent, with headquarters at Atlanta, Ga., succeeding J. M. Harris, promoted. C. L. Tipton succeeds Mr. Carlton.

James Robertson, assistant general freight agent of the Duluth, South Shore & Atlantic and the Mineral Range Railroad at Duluth, Minn., has been appointed also assistant general passenger agent, succeeding James Maney, promoted.

T. L. Bingham has been appointed agent of the Western Transit Company and the Rutland Transit Company, steamship lines of the New York Central, with office at St. Louis, Mo., succeeding J. G. Pullinger, resigned to accept service elsewhere.

H. S. Duval, traveling freight agent of the Southern Railway at Albany, Ga., has been transferred to Valdosta, Ga. H. W. Watson succeeds Mr. Duval, with office at Albany, and W. C. Plant has been appointed freight soliciting agent, with office at Memphis, Tenn.

The following appointments have been made on the Raleigh & Charleston: E. D. Kyle, freight traffic manager; C. B. Ryan, general passenger agent; R. I. Cheatham, assistant freight traffic manager; L. E. Chalenor, general freight agent; G. S. Rains, assistant general freight agent.

T. G. Ratcliff, chief clerk to the traffic manager of the Galveston, Harrisburg & San Antonio, at Houston, Tex., has been appointed commercial agent of the Houston East & West Texas, with office at Houston, succeeding J. B. Gibson, resigned to become agent of the Frisco Refrigerator Line.

C. J. Longbotham, general agent in the freight department of the Chicago Great Western at Duluth, Minn., has been appointed general agent in the freight department, with office at St. Paul, Minn., succeeding J. N. Storr, resigned to engage in other business. R. A. Bishop, agent at Winona, Minn., succeeds Mr. Longbotham.

W. F. Mundee has been appointed commercial freight agent of the Seaboard Air Line, at Jacksonville, Fla., with office at Jacksonville. R. H. Dozier, commercial agent at Jacksonville, has been appointed contracting freight agent at Jacksonville, reporting to the commercial freight agent, and C. I. Malone has been appointed contracting freight agent, with office at Atlanta, Ga.

Edward Eden, traveling freight agent of the Canadian Pacific, the Minneapolis, St. Paul & Sault Ste. Marie, the Canadian Pacific Despatch and the Duluth, South Shore & Atlantic at Chicago, has been appointed agent of these lines, with headquarters at Omaha, Neb. His territory, comprising the state of Iowa, parts of Minnesota and South Dakota, and Omaha, Neb., remains the same.

E. B. Reynolds, soliciting agent of the Louisville & Nashville at Memphis, Tenn., has been appointed a traveling freight agent, with office at Memphis. B. H. Wallace succeeds Mr. Reynolds. H. T. Drane, soliciting agent at Selma, Ala., has been appointed traveling freight agent, with office at Macon, Ga., succeeding C. L. Whaley, resigned, and Robert C. Gucker succeeds Mr. Drane, with office at Selma.

J. E. Branch, traveling freight agent of the St. Louis & San Francisco Lines at Atlanta, Ga., has been appointed commercial agent, with office at Jacksonville, Fla., succeeding M. M. Hogan, resigned, and F. G. Roberts, soliciting freight agent at Atlanta, succeeds Mr. Branch. S. R. Carson succeeds Mr. Roberts. J. E. W. Fields, chief rate clerk at Houston, Tex., has been appointed assistant to the general Eastern agent, with office in New York.

H. F. Harden, soliciting freight agent of the Cincinnati, New Orleans & Texas Pacific at Cincinnati, Ohio, has been appointed traveling freight agent, with office at Indianapolis, Ind., succeeding L. E. Banta, transferred. W. S. Logan succeeds Mr. Harden. B. Q. Gasner has been appointed traveling freight agent, with headquarters at Cincinnati, Ohio, succeeding J. W. Piatt, transferred, and A. H. Fulkerson has been appointed traveling freight agent, with office at Jacksonville, Fla., succeeding W. E. Hurley, transferred.

G. N. Thomas, traveling freight agent of the Wabash at Pittsburgh, Pa., has been appointed general agent, with office at Pitts-

burgh, succeeding R. E. Lawrence, deceased, and D. E. Gilbert, contracting agent at Pittsburgh, succeeds Mr. Thomas. W. D. Stubbs, general agent, with offices at Seattle, Wash., and Portland, Ore., having resigned to go into other business, F. H. Wegener, traveling freight and passenger agent at Seattle, has been appointed general agent at Seattle, and C. A. Pettibone, traveling freight and passenger agent at Portland, has been appointed general agent at Portland.

The territory east of Alpha, N. J. (with exception of Newark, N. J.), on the Lehigh Valley, will hereafter be under the direct supervision of the general offices at New York. O. F. Johnson has been appointed traveling freight agent, with headquarters at New York, in charge of the territory east of Alpha, N. J. (not including Newark), and will assume such other duties as may be assigned to him by the general freight agent. A. B. Walmsley, division freight agent at Newark, has been appointed commercial agent at Newark. The jurisdiction of O. M. Barres, division freight agent at South Bethlehem, Pa., has been extended to include the Mahanoy & Hazleton division, Penn Haven Junction, Pa., to Mount Carmel, including Beaver Meadow branch, Highland branch, Ashland branch, and Quakake branch, Pottsville branch, Lizard Creek Junction, Pa., to Pottsville, and adjacent territory on connecting roads. H. E. Dengler, division freight agent at Hazleton, Pa., has been appointed commercial agent at Hazleton. W. T. Grier, coal freight agent, has been appointed general coal and freight agent, with office at New York, and S. A. Story has been appointed through freight agent, with office at Buffalo, N. Y.

Engineering and Rolling Stock Officers.

See item regarding duties of officers on Southern Railway under Operating Officers.

W. F. Hart has been appointed chief engineer of the Memphis, Dallas & Gulf, with office at Nashville, Ark., succeeding A. M. Van Auken, resigned.

John Fletcher, superintendent of telegraph of the Canadian Pacific at Vancouver, B. C., has been appointed to the new position of telegraphic superintendent of traffic.

Samuel G. Thomson, assistant engineer of motive power of the Philadelphia & Reading, has been appointed acting superintendent of motive power and rolling equipment with office at Reading, Pa., succeeding Howard D. Taylor, resigned.

C. W. Cross, superintendent of apprentices of the New York Central & Hudson River at New York, and G. W. Good, supervisor of piece work, also with office at New York, have been transferred to Chicago, where they will have jurisdiction over the New York Central Lines west of Buffalo.

T. Rumney, general mechanical superintendent of the Erie at New York, has been appointed assistant second vice-president of the Rock Island Lines in charge of the mechanical department, with office at Chicago, succeeding W. A. Nettleton, general superintendent of motive power, resigned.

William Schlafge, mechanical superintendent of the Erie Railroad at Jersey City, N. J., has been appointed general mechanical superintendent, with office at New York, succeeding T. Rumney, resigned, to go to the Chicago, Rock Island & Pacific. A. G. Trumbull, mechanical superintendent at Cleveland, Ohio, has been transferred to Jersey City; E. S. Fitzsimmons, master mechanic at Hornell, N. Y., has been promoted to mechanical superintendent at Cleveland; L. R. Laizure, master mechanic at Cleveland, has been transferred to Hornell, and J. A. Boyden, general foreman at Hornell, has been promoted to master mechanic at Cleveland.

W. N. Spangler, supervisor of signals of the Pennsylvania Railroad at New York, has been appointed inspector of signals in the office of the signal engineer at Philadelphia, Pa., and B. F. Oler, supervisor of signals at Camden, N. J., succeeds Mr. Spangler. E. K. Post, supervisor of signals at Media, Pa., succeeds Mr. Oler, and W. I. Bell, assistant supervisor of signals at Altoona, Pa., succeeds Mr. Post. P. A. Rainey, assistant supervisor of signals at Harrisburg, Pa., has been transferred to the middle division at Altoona, succeeding Mr. Bell, and E. G. Bauman, foreman at the Jersey City terminal on the New York division, succeeds Mr. Rainey. L. E. Carpenter, supervisor of signals at Williamsport, Pa., has been appointed supervisor of signals on the Philadelphia terminal division, with office at West Philadelphia, succeeding C. E. Goings, transferred to the office of the signal engineer. J. H. Broadbent, supervisor of signals on the Allegheny division at Kittanning, Pa., succeeds Mr. Carpenter on the Williamsport and Susquehanna divisions, and B. F. Dickinson, assistant supervisor of signals at Jersey City, succeeds Mr. Broadbent. E. M. Hatton, acting assistant supervisor of signals on the Baltimore division, has been appointed assistant supervisor of signals on the New York division, succeeding Mr. Dickinson.

John Moore James, whose appointment as superintendent of motive power of the Western Pennsylvania division of the Pennsylvania Railroad has been announced in these columns, was born on September 10, 1875, at Wellsville, Ohio, and was educated in the public schools of his native town and at the Ohio State University. He entered the service of the Pennsylvania Railroad as a machinist apprentice in the Altoona shops in 1893, and was appointed assistant foreman of car inspectors at Washington, D. C., in May, 1899. The following January he was made foreman of the Anacosta shops of the Philadelphia, Baltimore & Washington, and in May of the same year he was promoted to general foreman at Washington. He was appointed general inspector of the Buffalo & Allegheny Valley division in October, 1900, and became assistant engineer of motive power of that division in January, 1902. The following December he was appointed master mechanic at the Olean, N. Y., shops, and in November, 1908, was transferred in the same capacity to the Buffalo division. He was again transferred on May 1, 1911, as master mechanic to the West Philadelphia, Pa., shops, which position he held at the time of his recent appointment as superintendent of motive power of the Western Pennsylvania division, with office at Pittsburgh, Pa.

J. M. James.

Purchasing Officers.

Adolph Butze, general purchasing agent of the Grand Trunk, with office at Montreal, Que., whose retirement on January 1, under the pension rules of the company, has already been announced in these columns, was born in October, 1845, at Quincy, Ill., and was educated in the public schools of his native town. Mr. Butze, after serving in the Civil War, entered railway service in 1868, and was for some time in the employ of the Wabash. In 1885 he went to the Missouri Pacific in the purchasing department, and two years later was made private secretary to the general manager of the Chicago, Indianapolis & Louisville. Mr. Burtze up to the time of his retirement had been in the service of the Grand Trunk for the past 16 years, having been appointed general purchasing agent of that road in 1896.

OBITUARY.

William F. Beyreiss, advertising agent of the Queen & Crescent Route, with office at Cincinnati, Ohio, died at that place on January 4.

Francis S. Jones, freight solicitor of the Pennsylvania Railroad at Jamestown, N. Y., and previous to that superintendent of the Jamestown, Chautauqua & Lake Erie, died on January 1 at Jamestown, at the age of 61 years.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Virginian Railway has ordered 9 mikado locomotives from the Baldwin Locomotive Works.

The Central Vermont has ordered three switching locomotives from the Lima Locomotive and Machine Company.

The Minneapolis, Red Lake & Manitoba has ordered 1 ten-wheel locomotive from the Baldwin Locomotive Works.

The Chicago, St. Paul, Minneapolis & Omaha has ordered 10 locomotives from the American Locomotive Company, in addition to the 5 switching locomotives mentioned in the *Railway Age Gazette* of December 22.

CAR BUILDING.

The Baltimore & Ohio is making inquiries for 36 passenger cars.

The Grand Trunk is making inquiries for 500 automobile cars and 500 refrigerator cars.

The Delaware, Lackawanna & Western has ordered 200 hopper cars from the American Car & Foundry Company.

The Chicago & North Western has ordered 550 thirty-ton 40-ft. refrigerator cars from the Haskell & Barker Car Company.

The Elgin, Joliet & Eastern has ordered 250 Williamson gondola cars and 250 hopper cars from the Pullman Company, and 250 hopper cars from the Standard Steel Car Company.

The Western Live Stock Express, Chicago, has ordered 100 double-deck stock cars, the bodies to be built by the Whipple Car Company and the steel underframes and trucks by the Bettendorf Axle Company. An option has been taken on an additional 100 double-deck stock cars.

The Pennsylvania Railroad has ordered 1,000 class H 22 coke cars from the Pressed Steel Car Company, 1,000 class H 21 coke cars and 200 class H 22 coke cars from the Cambria Steel Company; 1,000 G. R. A. gondola cars from the American Car & Foundry Company, and 800 class H 22 coke cars from the Standard Steel Car Company.

The New York Central Lines have ordered 50 coaches and 10 smoking cars from the American Car & Foundry Company, 35 combination passenger and baggage cars from the Standard Steel Car Company, 15 baggage cars from the Pressed Steel Car Company, and 25 coaches and 20 smoking cars from the Barney & Smith Car Company. The New York Central & Hudson River will receive 50 coaches, 15 baggage cars, 30 combination passenger and baggage cars, and 20 smoking cars; the Lake Shore & Michigan Southern will receive 10 smoking cars and 5 combination passenger and baggage cars; the Cleveland, Cincinnati, Chicago & St. Louis will receive 25 coaches. This company is still negotiating for 2 combination mail and baggage cars and 2 combination passenger, mail and baggage cars.

IRON AND STEEL.

The Southern Railway has ordered 3,000 tons of rails from the Maryland Steel Company.

The Chicago, Burlington & Quincy has ordered 1,200 tons of bridge material from the American Bridge Company.

The Delaware & Hudson is reported to have ordered 12,000 tons of open hearth rail from the Bethlehem Steel Company.

The Great Northern is reported to have ordered 38,000 tons of rails, divided between the United States Steel Corporation, the Lackawanna Steel Company, and the Cambria Steel Company.

General Conditions in Steel.—The operations of the steel mills have not increased since the first of the year, which had been expected from the heavy orders received in November and December. The explanation appears to be that the new orders are for immediate delivery, but will be spread over a period of several months. The principal feature of interest in the steel trade at present is the activity in fabricated structural steel for buildings and bridges, in which the railways are figuring prominently. President Farrell, of the Steel Corporation, expects the mills to operate at full capacity in the near future.

SIGNALING.

The Missouri Pacific plans to erect automatic block signals during the present year on the line from Sheffield, Mo., to Leeds, four miles; and from Independence, Mo., to Kansas City Southwestern Junction, five miles.

The Southern Railway will put up automatic block signals on the line from Denim, a point about three miles north of Greensboro, N. C., to Charlotte, N. C., a distance of about 97 miles. This entire stretch is double track, with the exception of five miles just south of Concord, N. C., which is single track. The signals will be of the three-position, upper quadrant type with the Railway Signal Association standard type A spectacle. There will be 116 signals.

The Gray-Thurber cab signal and automatic train stop, which has been in use experimentally on the Pennsylvania Lines west of Pittsburgh, was tested at a public exhibition on December 29, with satisfactory results. Messrs. Gray and Thurber have been making experimental runs since the beginning of December. The tests are made on one of the westbound tracks of the main line of the Fort Wayne, between Jack's Run and Glenfield, about 5 miles. This apparatus not only gives an audible signal in the cab of the locomotive and applies the brakes, but also shuts off steam. The electric circuits connecting the engine apparatus with the roadside apparatus, are run through the rails of the track and are controlled by means of an insulation between the locomotive and the tender, or between one pair of wheels of the locomotive and the rest of the engine.

Railway Equipment in New Zealand.

It is now the policy of the New Zealand government to make all its own rolling stock, even though it is admitted that it costs about one-third more to do so than if such equipment were imported from England or the United States. The present styles of locally made rolling stock conform to American patterns rather than British. On account of the narrow gage of New Zealand railways, 3 ft. 6 in., the locomotives and cars must be built much narrower than those intended for use on American railways, and this has led to some original local designs for economy of space. The chief mechanical engineer of the New Zealand railways, A. L. Beattie, whose position corresponds with that of superintendent of motive power on American railways, is a member of the American Railway Master Mechanics' Association, and is a strong advocate of American models for locomotives and cars. Mr. Beattie tells me that were it not the present government policy to make its own equipment, he would favor importing all the rolling stock for New Zealand railways from the United States, as American-built equipment previously bought has given much more satisfaction than that bought in England. Out of 478 locomotives now in use on the New Zealand railways, 109 were built in the United States and about 300 in England, the remainder having been built in New Zealand during the last four or five years, chiefly according to American designs modified to suit local conditions. Out of 1,166 cars used on the New Zealand railways, about 100 were American built. The only imported parts of the present locally made equipment consist of the steel tires or rims for the wheels and the larger steel castings. The chief local workshops for making this equipment are at Addington, a suburb of Christchurch. There is a large use here of machine tools and lathes, mostly from the United States, and much attention is paid to the latest American improvements, with a view to their introduction here. Westinghouse airbrakes are used, and the Pintsch system of car lighting. There are five separate Pintsch gas works manufacturing oil gas, the amount used by the government railways in 1910 being 8,270,930 cu. ft., costing about 50 cents per 100 cu. ft. The cars are now nearly all fitted with incandescent mantles. Acetylene gas is used for locomotive headlights.—*Minister of Railways for New Zealand.*

Supply Trade News.

Street mechanical stokers, designed by Clement F. Street, Schenectady, N. Y., have been specified for the nine mikado locomotives just ordered by the Virginian Railway from the Baldwin Locomotive Works.

C. E. Tripp, of the Stone & Webster Engineering Corporation, Boston, Mass., has been made chairman of the board of directors of the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., succeeding Robert Mather, deceased.

The Isthmian Canal Commission will receive bids until January 24 on cast iron car wheels, and until January 25 on automatic signal material, for the relocated line of the Panama Railroad. (Circulars 671 and 669, respectively.)

C. E. Knickerbocker, member American Society Civil Engineers and lately resigned as chief engineer of the New York, Ontario & Western, has gone to the MacDonald Construction Company, New York, in charge of railway construction.

Judge Elbert H. Garry, chairman of the United States Steel Corporation, New York, has resigned his position as chairman of the board of directors of the Allis-Chalmers Company, Milwaukee, Wis. It has just been made known that Judge Gary also resigned from the directorate of the American Steel Foundries, New York, some time ago.

The Baldwin Locomotive Works, Philadelphia, Pa., has bought 320 acres of land at Calumet, Ind., near Indiana Harbor, upon which it will immediately begin the erection of a plant with a capacity of building 10 locomotives a week. Additions will be made later which will increase the capacity to 30 locomotives a week, and will give employment to 5,000 men.

James A. Scully, work superintendent of the Whiting Foundry & Equipment Company, Harvey, Ill., and George E. Jones, superintendent of outside erection and complaint adjustment of the Whiting company, have resigned their positions and have organized Scully, Jones & Co., Chicago, to make and sell foundry equipment and supplies, machinists' supplies and railway appliances.

D. F. Lillis has been appointed Eastern sales agent of the Grip Nut Company, Chicago, with headquarters in New York. Mr. Lillis has been engaged in railway work for about 20 years, and has been chief clerk to four presidents of the Lake Shore & Michigan Southern. Later he was secretary to J. F. Deems, until recently general superintendent of motive power, rolling stock and machinery of the New York Central lines.

The Standard Railway Equipment Company, Pittsburgh, Pa., and the Monarch Pneumatic Tool Company, St. Louis, Mo., will in future keep their respective orders and business transactions separate. The Standard company will receive all orders for roof materials and carlines, and the Monarch company will receive all orders for pneumatic tools. P. H. Murphy is president of the Standard company and William Miller is president of the Monarch company.

The Scullin-Gallagher Iron & Steel Company, St. Louis, Mo., made a new record during December for low cost of production and maximum tonnage in plant No. 2. This company has recently ordered a 45-ton pouring crane from the Alliance Machine Company, Alliance, Ohio, and a turbine air compressor from the Ingersoll-Rand Company, New York, to use exhaust steam capable of throwing 4,000 cu. ft. of air per minute at 100 lbs. pressure.

J. G. White & Company, Inc., New York, have just purchased 124 miles of 12-in. steel pipe to be used in building a natural gas line in California. The pipe will weigh approximately 11,000 tons, and, with transportation, will cost approximately $600,000. Quotations were asked from British, German and French manufacturers, and the best foreign price was that of a British firm, which, exclusive of duty and freight, was approximately double that at which the contract was placed with the National Tube Company, Pittsburgh, Pa.

W. O. Jacquette has resigned as vice-president of Manning, Maxwell & Moore, Inc., New York. Mr. Jacquette has made no plans for the future, but for the present will make his headquarters at 165 Broadway, New York. Charles L. Lyle, heretofore manager for Manning, Maxwell & Moore, at St. Louis, Mo., has been made western manager for the Niles-Bement-Pond Company, New York, with office at St. Louis. Mr. Lyle was connected with the Niles-Bement-Pond Company until some nine years ago, when he left to go with Manning, Maxwell & Moore.

George W. Fowler, for many years sales manager of the Garwood Electric Company, New York, and W. J. Warder, Jr., formerly chief engineer and superintendent of Roth Brothers, Chicago, and later with the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., have resigned to enter the sales department of the Crocker-Wheeler Company, Ampere, N. J. A. K. Selden, Jr., for some years in charge of the design of motors for the Electro Dynamic Company, New York, has resigned to enter the engineering department of the Crocker-Wheeler Company.

Morris E. Ward, general sales agent of the Chicago-Cleveland Car Roofing Company, Chicago, died in Chicago on January 7 of a complication of diseases at the age of 68 years. Mr. Ward served for three years in the Civil War, and later was associated with several newspapers in various parts of the West. In 1874 he became city editor of the Denver *News,* and, later city editor of the Omaha *Republican.* For seven years he was railway editor of the old Chicago *Times,* after which he was for three years connected with the Allen Paper Car Wheel Company, and for three years with the Wickes Refrigerator Company. He had been general sales agent of the Chicago-Cleveland Car Roofing Company for 18 years.

The Bureau of Associated Geological Engineers, with main office at 131 State street, Boston, Mass., and a branch at 331 Fourth avenue, Pittsburgh, Pa., an association that has engaged in geological engineering, has recently entered the railway field, specializing in examinations of mineral properties and the possibilities of mining and quarrying developments along the lines of the various railways, reporting on the most favorable localities for obtaining water supplies, and on the geological conditions bearing upon the stability of bridge and other foundations. The managers are Myron L. Fuller and Frederick G. Clapp, both former members of the United States Geological Survey.

The Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has received an order for the complete equipment of three rotary converter sub-stations and one transformer sub-station from the Kansas City, Clay County & St. Joseph Railway Company. The transformer junction station will contain three 750 kva., 25 cycle, 6,600-33,000 v. transformers. Each rotary converter sub-station consists of six 185 kva., 25 cycle transformers, 33,000 v. primary to rotary converter secondary voltage, and two 500 kw. 25 cycle, 1,200 v. direct current rotary converters. The road runs from Kansas City, Mo., to St. Joseph, with a branch from Kansas City to Excelsior Springs, with a total mileage of 80 miles.

Richard T. Crane, president of the Crane Company, Chicago, died at his home January 8. Mr. Crane's death was sudden; his illness had not been considered serious. Mr. Crane was born in Paterson, N. J., in 1832, and worked in machine shops in Paterson, New York and Brooklyn, N. Y., until he was 23 years old, when he moved to Chicago. An uncle, Martin Ryerson, gave him a small piece of land on which he started a brass foundry. His brother, Charles S. Crane, subsequently joined him, and the machine manufacturing company of R. T. Crane & Brother was formed. This concern later grew into the Northwestern Manufacturing Company, and after that into the Crane Brothers Manufacturing Company, from which it evolved into the Crane Company.

Charles I. Young, of the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., died on January 6. Mr. Young graduated from Princeton University in 1883. He started his business career with the Edison Machine Works at New York, and later became superintendent of the Edison Illuminating Company, New York. In 1886 he went with the Westinghouse company. Due to an electric shock of 2,500 v., received in 1888, he was incapacitated for work for the three years following. In 1891 he again became associated with the Westinghouse company, and while he was physically weak and partially dependent on the

help of another, he retained all his mental faculties, and his knowledge of the electrical business from the beginning fitted him splendidly for work in the sales department as advisory engineer, first in the office at Philadelphia, Pa., later in the export department, and finally at East Pittsburgh, Pa. As instructor in the commercial training department in the sales organization he achieved remarkable success.

TRADE PUBLICATIONS.

Gage Glass Protectors.—The Ashcroft Manufacturing Company, New York, has published a small folder on the Ashcroft gage glass protectors, consisting of malleable iron frames.

Fans.—The American Blower Company, Detroit, Mich., has published "Fact Bulletin" No. 3, giving the present standing of several suits which are now being carried on between this company and other fan manufacturers.

Mechanical Stokers.—The E. R. Allen Foundry Company, Corning, N. Y., has issued a pamphlet devoted to the Elliott mechanical stoker, describing and illustrating its method of automatically taking care of coal, fire and ashes.

Atlantic Coast Line.—The passenger department of this company has published a useful little folder entitled What to Say in Spanish and How to Say It, giving brief, selected vocabularies on many of the most common subjects.

Southern Railway.—The land and industrial department of this company has published a small illustrated folder on the activities of the Southern Railway in the good roads movements along its lines. Interesting results are given.

Pennsylvania.—The freight department of this company has published a small, useful little booklet on the essentials of soil fertility, which gives a good deal of information on the proper method of preparing soil to obtain the best results.

Pneumatic Tools.—The Chicago Pneumatic Tool Company, Chicago, has issued bulletin No. 34 C, devoted to Chicago pneumatic tandem gasolene-driven compressors. This company has also issued a booklet on compressors for air and gas.

Compressors.—The Ingersoll-Rand Company, New York, has published form No. 3211 on Imperial type X, duplex, steam-driven compressors, in which detailed descriptions are given and many advantages enumerated. Diagrams and dimension tables are included.

Northern Pacific.—The passenger department of this company has published a very attractive 25-page booklet on the Bitter Route Valley in Montana, in which are described the great productivity and diversity of resources and the climatic attractions of this region. Brief accounts of several small towns are included.

Journal Boxes.—The Locomotive Equipment Company, Detroit, Mich., has published in bulletin J-1 facts about the Newcomb journal box, in which ten definite advantages are clearly and concisely given. Some interesting results of tests are included to substantiate these claims. Illustrations and diagrams are included.

Locomotive Cranes.—The Browning Engineering Company, Cleveland, Ohio, has just published an unusually attractive and useful catalog descriptive of the various types of Browning locomotive cranes and the many different uses to which the cranes and their various attachments are adapted. In addition to illustrating and describing briefly a few of the more important details of construction the book contains many excellent photographs showing locomotive cranes, clam shell buckets, electric lift magnets, wrecking cranes, railway ditchers, revolving steam shovels and pile drivers in actual use in various large plants. These photographs include illustrations of methods of using cranes for the lifting of all sorts of heavy objects, in car building yards and steel plants, in trestle building, for handling and breaking up scrap, loading and unloading cars and boats, handling timber, in building wrecking, and in various kinds of excavation work, as well as for many other purposes too numerous to mention.

Railway Construction.

New Incorporations, Surveys, Etc.

Atlantic Coast Line.—The Haines City branch of the Third district has been opened for business from Haines City, Fla., south to Crooked Lake.

Canadian Northern.—The Brandon Maryfield-Lampman section is open for business between Brandon, Man., and Ceylon, Sask., 232 miles.

The Neepawa-Beulah section is open for business between Neepawa, Man., and Beulah, 81 miles.

The Hudson Bay Junction-Le Pas sub-division is open for business between Hudson Bay Junction, Sask., and Le Pas, Kewatin, 87½ miles.

The Sturgeon River sub-division is open for business between North Battleford, Sask., and Edam, 38 miles.

Train service on the Oak Point sub-division has been extended from Oak Point, Man., to Gypsumville, 92 miles.

The Delisle-MacRorie line is now in operation between Delisle, Sask., and MacRorie, 46 miles.

The Calgary section has been extended from Kindersley, Sask., to Alsask, 44 miles.

The Thunderhill branch has been extended from Pelly, Sask., to Preeceville, 38½ miles.

An extension on the Shellbrook-Crooked Lake line has been opened for business from Shellbrook, Sask., to Blaine Lake, 36 miles, and from Shellbrook to Big River, 56½ miles.

Chicago, Milwaukee & Puget Sound.—According to press reports this company has about completed work on the line to Coeur d'Aline, Idaho, and is negotiating for the right of way with the Wallace-Spokane Company, which holds the franchise privileges over the government and state lands between Coeur d'Alene and Wallace by way of the Fourth of July canyon.

Delaware, Lackawanna & Western.—The new line between Lake Hopatcong, N. J., and Slateford Junction, Pa., 29 miles, has been opened for business.

This company will build a new line from Clarke's Summit, Pa., to Hallstead, to reduce the distance between the two points from 38 to 35 miles, and to eliminate curves and heavy grades between Scranton and Binghamton. Contracts will be let in ten sections. The work will include building a concrete bridge near Nicholson, to replace the present tunnel at that point.

Detroit & Mackinac.—Train service has been put in operation on the Rogers City branch from Calcite, Mich., north to Rogers City, 3 miles.

Erie Railroad.—This company during the past year built 42 miles of second track between Leavittsburg, Ohio, and Marion. Arrangements have been made for completing an additional 11 miles during January. W. J. Harahan, vice-president, New York. (July 14, p. 104.)

Iowa & Southwestern.—An officer writes that work has recently been finished on the line from Clarinda, Iowa, southwest via Colorado Springs to Blanchard, on the Wabash Railroad, 17½ miles. The company expects to develop a traffic in live-stock, lumber, coal, grain and merchandise. W. S. Farquhar, president; C. B. Judd, chief engineer, Clarinda.

Liberty-White.—This road has been extended from Kaigler, Miss., to Bridges, 3 miles.

Lynchburg-Danville & Carolina.—Incorporated in Virginia with $25,000 capital, and office at Amherst, Va. The plans call for building from a point on the Chesapeake & Ohio near Lynchburg, Va., south to the Virginia-North Carolina State line, near Milton, N. C., about 70 miles. T. O. Troy, president; W. P. Read, secretary, both of Amherst; A. B. Carrington, R. A. James and W. R. Fitzgerald, all of Danville; J. E. Bowman, E. Meeks and L. B. Davies, all of Amherst, are directors.

Memphis Railway Bridge & Terminal Company.—See Memphis, Tenn., under Railway Structures.

Northern Pacific.—Bids are now being asked for, it is said, to build the Point Defiance line from Tacoma, Wash., to Tenino. Work on the line had been held up for some time owing to the

delay in securing the necessary franchises. (November 10, p. 975C.)

OHIO & KENTUCKY.—This road has been extended from Malone, Ky., to Liberty Road, 3½ miles.

OKLAHOMA-NORTH WESTERN.—This company was incorporated last year with $100,000 capital to build from Oklahoma City, Okla., into the northwestern section of Oklahoma. It is said that financial arrangements have been made. John W. Shartell, of the Oklahoma Railway Company, Oklahoma City, is said to be back of the project.

OREGON SHORT LINE.—On the Idaho division the following branches have been opened for business: Paris branch, from Montpelier, Idaho, to Paris, 9½ miles; North Side branch, from Rupert west to Bliss, 73 miles; Oakley branch from Burley west to Oakley, 22 miles; Caldwell branch Caldwell to Wilder, 11 miles.

PECOS VALLEY SOUTHERN.—This road has been extended from Balmorhea, Tex., to Toyahvale, 3½ miles.

PEMBROKE, RED SPRINGS & NORTHERN.—Incorporated in North Carolina with $75,000 capital to build from Red Springs, N. C. to Pembroke, about 12 miles. The incorporators include W. J. Johnson, J. D. McLean, J. L. McMillan and J. G. Williams, all of Red Springs.

PENINSULAR RAILWAY (Electric).—Construction work is soon to be started on the extension from Palo Alto, Cal., into San Mateo county. The work includes putting up a concrete viaduct over San Francisquito creek near Palo Alto.

PORTLAND & WEST COAST RAILROAD & NAVIGATION COMPANY.—Application has been made at Bay City, Ore., for a franchise. The company has already been granted permits to build through Sheridan, Willamina, Bentley, Tillamook, Dolph and Hebo. It is understood that the company will build a hydro-electric power plant. W. F. Pries, C. M. Hendrickson and J. H. Upton are incorporators. (November 3, p. 932.)

QUANAH, ACME & PACIFIC.—An officer is quoted as saying that work will be started soon on an extension from Paducah southwest on about 50 miles. (September 22, p. 576.)

ROARING FORK.—Work has been finished on the line from Roaring Fork, Va., to Pardee, 4½ miles.

SEABOARD AIR LINE.—On the Fifth division the Plant City branch has been extended from Bradley Junction, Fla., to Agricola, 5 miles; and the Sarasota branch has been extended from Sarasota south to Venice, 19 miles.

SEABOARD AIR LINE.—See Norlina, N. C., under Railway Structures.

WICHITA FALLS & NORTHWESTERN.—Train service is now in operation on the Fifth division, between Hammon, Okla., and Leedy, 19 miles.

WINNIPEG, SALINA & GULF.—Application has been made in Kansas to issue bonds. The company plans to build from Omaha, Neb., southeast to Oklahoma City, Okla., with another line from Kansas City, Mo., to Des Moines, N. Mex. H. L. Miller, president; C. C. Whitehead, secretary. The headquarters of the company are at Salina, Kan. (June 23, p. 1675.)

RAILWAY STRUCTURES.

BELLS, TEX.—J. J. Maloney, of Dallas, has been awarded the contract for building a new passenger station for the Missouri, Kansas & Texas and the Texas & Pacific.

EL PASO, TEX.—Work is to be started at once on a reinforced concrete freight house for the Texas Pacific, to cost about $75,000.

HAMILTON, ONT.—The Toronto, Hamilton & Buffalo is planning to make improvements to include extensions to the freight sheds and yards at Hamilton.

HARRISBURG, ORE.—Permission has been granted to the Oregon Electric to build a bridge over the Willamette River, near Harrisburg.

KINGSVILLE, TEX.—The St. Louis, Brownsville & Mexico, according to reports, will enlarge its repair shops at this point and order a large amount of new machinery in addition to erecting a new passenger station.

LOS ANGELES, CAL.—The Pacific Electric, it is understood, will put up new shops at Dominguez, about 13 miles from Los Angeles. The estimated cost of improvements is $250,000.

MEMPHIS, TENN.—The Memphis Railway Bridge & Terminal Company has applied for a charter in Tennessee to build a bridge across the Mississippi river at Memphis, to be used by the Rock Island Lines. J. T. Harahan, former president of the Illinois Central, is one of the incorporators. Plans for the improvement are being prepared by the Rock Island, and will include terminal yards and freight houses, as well as large freight warehouses in the city, involving an expenditure of several million dollars in all.

NICHOLSON, PA.—See Delaware, Lackawanna & Western under Railway Construction.

NORLINA, N. C.—The Seaboard Air Line has bought land at Norlina, it is said, as a site for shops. It is understood that the plans include a change of line between Raleigh and Durham.

OAKLAND, CAL.—The Oakland & Antioch, with headquarters at San Francisco, is said to be making plans for putting up a station and terminal buildings on property recently secured at Fortieth and Opal streets, in Oakland.

PALO ALTO, CAL.—See Peninsular Railway under Railway Construction.

PHILADELPHIA, PA.—The Philadelphia & Reading will build a new station at Falls of Schuylkill soon. The building will cost about $25,000.

PINE BLUFF, ARK.—The machine and boiler shops of the St. Louis Southwestern were destroyed by fire on January 1, with a loss of about $80,000. It is expected that the shops will be rebuilt.

PORT HURON, MICH.—The Pere Marquette station and office building was destroyed by fire on January 2, with a loss of about $20,000. The building may be rebuilt.

SEYMOUR, TEX.—The Gulf Texas & Western and the Wichita Valley are preparing to build a new union station.

TORONTO, ONT.—The Canadian Pacific is building a 16-story office building in Toronto, with a frontage of 75 ft. on King street and 125 ft. on Yonge street. Several floors are to be occupied by the railway for its own offices, and others are to be rented.

VILLA RICA, GA.—The Southern Railway is building a new station at Villa Rica.

VINCENNES, IND.—The Indiana railway commission has ordered the Baltimore & Ohio Southwestern, the Chicago & Eastern Illinois, the Vandalia, and the Cleveland, Cincinnati, Chicago & St. Louis to submit plans for the improvement of the union station by March 1.

WINFIELD, KAN.—The St. Louis & San Francisco has notified the Kansas railway commission that it will build a new passenger station at Winfield.

FOREIGN RAILWAY NOTES.

The government of Paraguay has granted a concession to Conde dos Nacimientos & Company for the construction and operation of a railway from Asuncion to Santo del Guaira.

On November 9, 1911, the minister of public works of Ecuador and Julian Fabre, manager of the Franco-Dutch Company, signed a contract in virtue of which the government of Ecuador grants to M. Fabre a concession to build and operate a railway, which leaving the port of Bolivar on the Gulf of Guayaquil is to pass through Cuenca and terminate at some navigable point on the upper Amazon. This line will undoubtedly be very important when once it is built, because in addition to its international significance it will cross four of the richest provinces of Ecuador and thus stimulate production and traffic, and give to them an outlet to the Atlantic ocean. The Franco-Dutch Company estimates the cost at about $40,000,000.

Railway Financial News.

Baltimore & Ohio.—The New York Public Service Commission has approved the proposal for the acquisition of the 215 outstanding minority shares of the Staten Island Rapid Transit by the B. & O. All the rest of the stock is now owned by the Baltimore & Ohio.

Boston & Lowell.—Stockholders have voted to increase the capital stock from $7,399,400 to $7,679,400, the additional stock to be sold to provide for additions and betterments.

Boston Railroad Holding Co.—See New York, New Haven & Hartford.

Buffalo, Rochester & Pittsburgh.—The New York Public Service Commission, Second district, has authorized this company to issue $1,229,375 4 per cent. equipment trust bonds.

Camino, Placerville & Lake Tahoe.—See Placerville & Lake Tahoe.

Chesapeake & Ohio.—The *Wall Street Journal* says that this company will probably sell to its bankers in the near future about $3,000,000 equipment trust notes.
See also Pere Marquette.

Colorado & Southern.—This company, which owns nearly all of the stock of the Colorado Springs & Cripple Creek District, has leased the road of the C. S. & C. C. D. to the Florence & Cripple Creek, which is owned by the Cripple Creek Central.

Colorado Springs & Cripple Creek District.—See Colorado & Southern.

Cripple Creek Central.—See Colorado & Southern.

Denver & Rio Grande.—In connection with the retirement of George Gould as chairman of the board of directors, and the election of B. F. Bush as president, mentioned in our "Elections and Appointments" columns, Mr. Gould issued a statement which says, among other things, that Mr. Jeffery (formerly president and now chairman of the board) will continue to have direct charge of the finances of the D. & R. G. and will, of course, exercise general supervision over the affairs of the company.

Florence & Cripple Creek.—See Colorado & Southern.

Minneapolis & St. Louis.—In a circular sent to stockholders, President Newman Erb says in part:

The Minneapolis & St. Louis was for 15 years up to January 1, 1910, able to pay dividends regularly on its preferred stock, and for about four years dividends upon its common stock. It has terminals in Minneapolis and St. Paul, which about two years ago were appraised by experts at approximately $7,300,000, or an amount exceeding 30 per cent. of the funded debt of that company. These terminals are capable, with moderate development, of meeting the requirements of the company for many years to come.

"The western terminus of the road at Le Beau, So. Dak., on the Missouri river, has no Western connection; on the south the Iowa Central at Albia connects with the Wabash Railroad, which, while interchanging traffic on friendly terms, has other connections to serve as well. Under these conditions the properties were dependent almost solely upon the development and prosperity of the immediate territory served, were highly competitive and without proper advantage of their 1,560 miles as a connecting link to territory beyond their own termini. Notwithstanding these adverse conditions, the gross earnings have been steadily increasing, exception being limited to two unusual crop failures recently.

The extension to the international Canadian boundary now contemplated will enable the company to add to its tonnage the business to and from the Canadian Northwest. A connection is contemplated with the Missouri, Kansas & Texas at or near Moberly, Mo., which will make your properties a north and south line from Canada to the Gulf, adding still more tonnage movement without any corresponding increase in the overhead or terminal charges. The extension to the Canadian border will take about 18 months to build. The connection with the M. K. & T. will be, it is intended, provided through trackage contracts. Arrangements are also under consideration for making the Peoria line, by a very modest amount of new construction and by connections at Peoria, an east and west line to Omaha. The gross earnings per mile of the properties for the past fiscal year were $5,570. With $1,000 additional revenue per mile through the extensions proposed, and with operations upon a normal ratio of cost, say, 70 per cent., we should more than meet all fixed charges and dividend requirements for the whole capitalization, the outstanding preferred stock being only $4,100 per mile and the common stock about $10,000 per mile.

"The financial provisions now being made will leave the properties free of all floating debt, with a reasonable amount of working capital. The new 'first mortgage and extension' bonds will be a first mortgage upon 229.6 miles of existing road and a general lien upon all the other properties. They will also be a first mortgage upon the extensions. When payment of dividends is resumed on the preferred stock the price at which you are permitted to subscribe for the securities will yield 7½ per cent. per annum."

New York Central & Hudson River.—See Rutland Railroad.

New York, New Haven & Hartford.—This company has sold through J. P. Morgan & Co., New York, $30,000,000 1-year 4 per cent. notes dated January 15. The notes are being offered to the public by Lee, Higginson & Co., Boston, Mass., at par. The company has maturing within the next two months $22,000,000 1-year notes and $7,290,000 other obligations.

Governor Foss, of Massachusetts, in an address to the legislature, says in part: "The Boston Railroad Holding Company is wholly indefensible, and I now demand that the constitutional power of the Commonwealth be exercised to dissolve it. If the two railways are not parallel or competing, then there is no objection to a consolidation of these properties, the principal condition being that the two lines shall be physically connected and thus provide for through passenger and freight service."

[Physical connection would mean presumably a tunnel under Boston between the North and South stations.]
See also Rutland Railroad.

New York & Harlem.—The directors have declared a dividend of 7 per cent., payable January 23. It is for the purpose of returning to the stockholders, prior to the sale of the stock to the New York Central, the amount of special franchise taxes which were held up some years ago pending a settlement with the Metropolitan Street Railway Company, lessee, of a dispute as to which corporation was responsible for the state tax. As a consequence of this dispute the New York & Harlem suspended dividends out of the rental of the street railway from October, 1908, until October, 1910. When the dividend was resumed it was at the rate of 3 per cent.

Pere Marquette.—Newman Erb and associates are said to be negotiating for the control of the Pere Marquette, and rumor says that the Chesapeake & Ohio may possibly eventually buy control of the Pere Marquette.

Placerville & Lake Tahoe.—This road was sold to the trustee of its mortgage bonds for $62,715. The Camino, Placerville & Lake Tahoe has been incorporated with $100,000 stock to take over the property.

Rutland Railroad.—The United States circuit court has denied an injunction to restrain the N. Y. C. & H. R. from transferring the remainder of the majority stock of the Rutland to the New York, New Haven & Hartford pending an action brought in the United States circuit court asking for a receiver for the Rutland. (Dec. 1, page 1150.)

San Pedro, Los Angeles & Salt Lake.—A special meeting of stockholders has been called for voting on the question of retiring the $60,000,000 authorized first mortgage bonds, of which $48,835,000 are outstanding; to make a new mortgage to secure an authorized issue of $70,000,000, and to authorize the directors to issue bonds at their discretion under this mortgage. The road is controlled jointly by the Harriman Line interests and Senator Clark.